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MEASUREMENT OF THE DRAWING ABILITY OF TWO THOUSAND ONE HUNDRED AND SEVENTY-SEVEN CHILDREN IN INDIANA CITY SCHOOL SYSTEMS BY A SUPPLEMENTED THORNDIKE SCALE

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During the winter of 1914, the writer, in coöperation with his class in School Administration, decided to use in a limited way the newly constructed Thorndike Scale to measure achievement in drawing for the purpose:

1. Of determining growth in ability from grade to grade.
2. Of determining standards or norms of ability for each grade.
3. Of determining limitations of the scale in actual use.
4. Of determining what administrative problems would be brought to light which might be desirable for supervising authorities to know.

METHOD OF DERIVING THE SUPPLEMENTED SCALE

A preliminary consideration of the scale and its application to a limited number of drawings convinced us that for our purposes it would be desirable to supplement the scale so that there might be a greater degree of uniformity in the composition represented by the different units of the scale. As several units

on the Thorndike Scale and many of the supplementary drawings represented snow scenes with action, it occurred to us to construct a scale every unit of which should represent a snow scene with human figures in action, placing houses, landscapes, etc., as accessory features.

For the purpose of supplementing the scale, drawings were chosen from the Thorndike supplementary sheet, numbered from one hundred one to one hundred seventeen, eleven of which represent snow scenes with human figures in action.

Seventeen judges were secured, consisting of teachers, graduate students, and seniors in Indiana University, to rank these supplementary drawings.

Tables I and II show the results of the comparisons.

TABLE I.

Rank Assigned Each Sample.

Judge	1	2	3	4	5	6	7	8	9	10	11
A	116	106	107	110	111	108	104	103	101	105	102
B	116	106	107	110	111	108	104	101	103	105	102
C	110	116	107	106	111	108	101	103	104	105	102
D	110	107	116	106	108	111	104	101	103	105	102
E	116	107	106	110	111	108	105	101	103	104	102
F	116	107	110	106	111	108	104	103	101	105	102
G	116	107	110	106	111	108	104	103	101	105	102
H	116	110	107	106	111	108	104	103	102	105	101
I	116	106	107	110	111	108	104	103	101	105	102
J	116	110	107	106	111	108	104	101	103	105	102
K	110	107	116	108	111	106	104	103	101	105	102
L	116	107	110	108	111	106	104	105	103	101	102
M	110	111	116	106	107	108	104	103	101	105	102
N	116	107	110	111	108	106	105	103	101	104	102
O	116	107	110	106	111	108	104	101	103	105	102
P	110	106	116	107	108	111	104	101	105	103	102
Q	116	107	106	110	111	108	104	101	103	105	102

1, 2, 3, etc.–11 represent the relative values from the poorest to the best.

From a comparison of the rankings of Table I, the percentage relationships expressed in Table II were derived.

TABLE II.

88%	of	the	judges	rated	107	as	better	than	116
71%	"	"	"	"	106	"	"	"	107
76%	"	"	"	"	111	"	"	"	106
76%	"	"	"	"	108	"	"	"	111
100%	"	"	"	"	104	"	"	"	108
82%	"	"	"	"	101	"	"	"	104
82%	"	"	"	"	105	"	"	"	101
94%	"	"	"	"	102	"	"	"	105

Samples 110 and 103 were omitted because they were given almost equal value with 107 and 101 respectively.

Considering the difference detected between two samples by seventy-five per cent. of the judges as unity, the samples in Table II have the following relative values:

TABLE III.

Sample	107	is	1.7	units	better	than	sample 116
"	106	"	.8	"	"	"	" 107
"	111	"	1.0	"	"	"	" 106
"	108	"	1.0	"	"	"	" 111
"	104	"	3.5	"	"	"	" 108
"	101	"	1.4	"	"	"	" 104
"	105	"	1.4	"	"	"	" 101
"	102	"	2.3	"	"	"	" 105

Having secured this table of relative values for the supplementary samples used, the next step in perfecting the supplemented Thorndike Scale was to fix, by comparison, the value of one, or better yet, of several of these samples on the Thorndike Scale. For this purpose ten of the seventeen judges who made the first set of comparisons were secured. Table IV indicates the results:

TABLE IV.

73%[2]	of the judges	ranked	sample[2]	T 6.5	as better	than	sample	116		
90%	" "	"	"	111.	"	"	"	"	T 8.6	
90%	" "	"	"	T 10.5	"	"	"	"	111	
63%[3]	" "	"	"	108	"	"	"	"	T 10.5	
80%	" "	"	"	T 13.5	"	"	"	"	104	
80%	" "	"	"	101	"	"	"	"	T 13.5	
70%	" "	"	"	T 14.4	"	"	"	"	101	
80%	" "	"	"	T 16	"	"	"	"	105	
70%	" "	"	"	102	"	"	"	"	T 17	

Reducing these per cents. to differences expressed in terms of the unit difference, or that detected by seventy-five per cent. of the judges, we have the results indicated in Table V.

From Tables III and V the final scale as given in Table VI was derived. In many cases a combination of differences indicated in Tables III and V was used in fixing the value of any given sample on the supplementary scale.

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[1] E. L. THORNDIKE. *The Measurement of Achievement in Drawing.* Teachers College Record, November, 1913, p. 25, Table 4.

[2] T 6.5 means the sample on the Thorndike Scale having a value of 6.5.

[3] Odd per cents. are due to some judges giving the samples equal rating.

TABLE V.

Sample	T 6.5	is	.9	units	better	than	sample	116
"	111	"	1.9	"	"	"	"	T 8.6
"	T 10.5	"	1.9	"	"	"	"	111
"	108	"	.5	"	"	"	"	T 10.5
"	T 13.5	"	1.2	"	"	"	"	104
"	101	"	1.2	"	"	"	"	T 13.5
"	T 14.4	"	.8	"	"	"	"	101
"	T 16	"	1.2	"	"	"	"	105
"	102	"	.8	"	"	"	"	T 17

The reader should bear in mind that the number of judgments upon which the foregoing tables are based is insufficient for accurate scientific work, but for obtaining approximate values for supplementary points on a scale already constructed the writer believes the results obtained are reasonably adequate.

TABLE VI.

The Supplemented Scale as Used.

Sample	Value	Sample	Value	Sample	Value
T 0.	0.0	106	8.0	T 13.5	13.5
T 2.4	2.4	T 8.6	8.6	101	14.0
T 3.9	3.9	111	9.3	T 14.4	14.4
116	5.5	T10.5	10.5	105	15.2
T 5.7	5.7	108	11.0	T 16.	1 .0
T 6.5	6.5	T11.8	11.8	T 17	17.0
107	7.2	T12.6	12.6	102	17.6
T 7.8	7.8	104	13.0		

The objection may be raised that this scale has too many fixed points. Those who used the supplemented scale report that a variety of samples of approximately equal value aids greatly in rating drawings. Both the Thorndike and Ayers writing scales make use of this principle by providing three samples under each quality on the scale.

There are still lacking samples of the general scale in the units 1 to 1.99, 2 to 2.99, 3 to 3.99, 4 to 4.99, and 12 to 12.99.

A Further Revision of the Scale.

Because of this lack of samples in the lower range of the scale and because of some criticisms made relative to the values assigned to samples 107 and 108, the following supplementary comparisons were made subsequent to the completion of the tests in systems A and B. Eleven judges compared samples T10.5, 108, 104, T13.5; ten judges compared samples 107 and T8.6; and twelve judges compared samples A, B, C, with 116.

Results of the Supplementary Comparisons

(1).

82%	of the judges	rated	108	as better	than	T	10.5
64%	"	"	"	104	"	"	"	108
55%	"	"	"	T 13.5	"	"	"	104

Combining these judgments with those of Tables II and IV we have the following:

73%	of the judges	rated	108	as better	than	T	10.5	or	.9	better
86%	"	"	"	104	"	"	"	108	"	1.6	"
67%	"	"	"	T 13.5	"	"	"	104	"	.7	"

These combined comparisons still give 104 approximately its former relative position with respect to T13.5 and T10.5, its value being reduced to 12.9, but the position of 108 is changed from .5 to .9 better than T10.5 and is thus given a value of 11.4.

What effect would these new values of 104 and 108 have upon the results from systems A and B? Whether the exact or unit group averages be taken, the surface of distribution more nearly approaches the normal probability surface in the ranges of the scale below 6 and between 11 and 14.

(2). 60% of the judges rated T8.6 as better than 107 or .4 better.

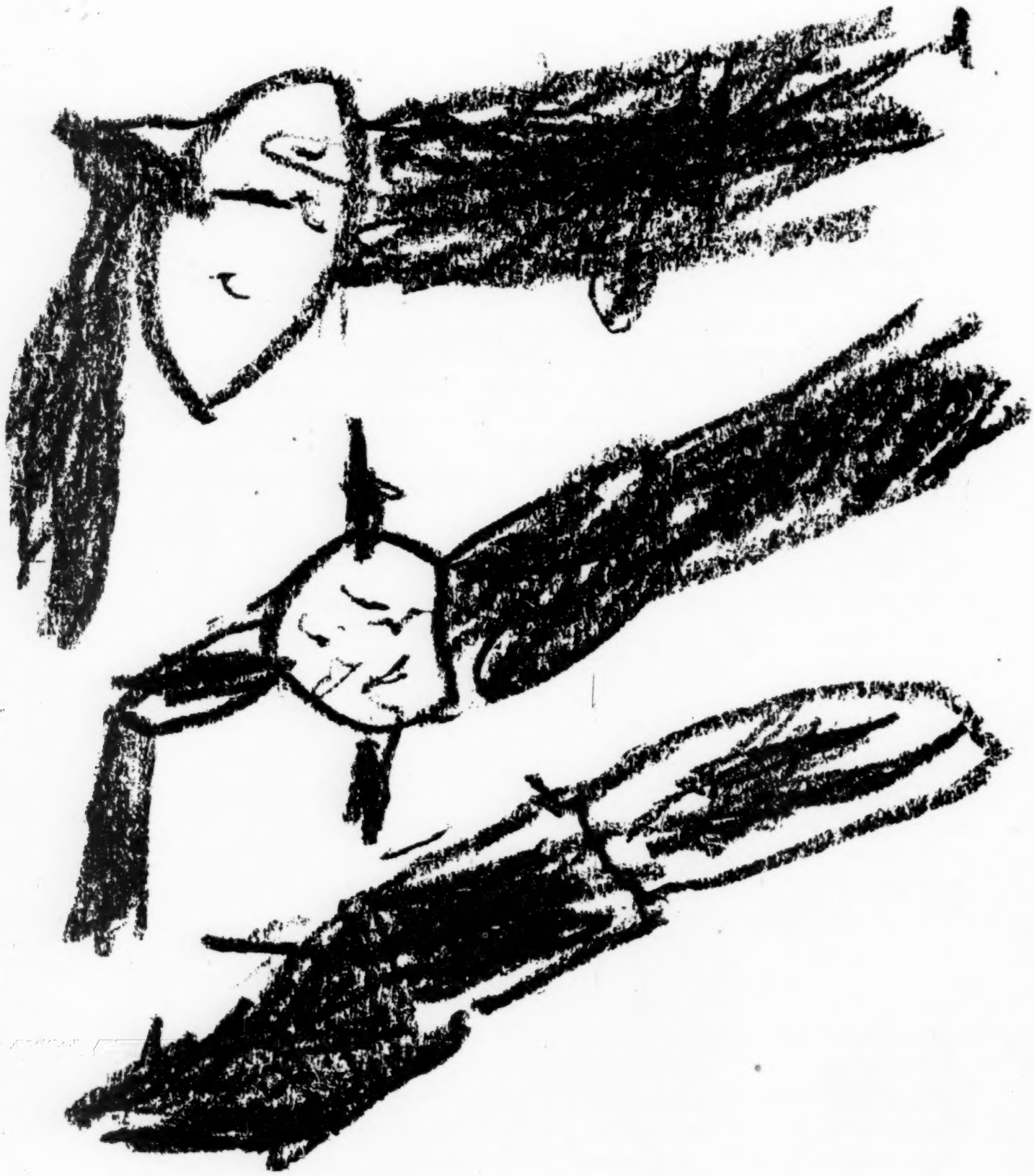
This gives 107 a value of 8.2. Combining this with the value 7.2 assigned as the result of comparisons between 116, 107, and T6.5, Tables III and V, a resultant of approximately 7.6 represents the new value for 107. If we substitute this value for sample 107 and reject sample 106 (value 8) from our scale, the results found in systems A and B will not be appreciably changed.

(3). Samples A, B, and C, together with several others, were chosen by the writer from the poorest drawings in system A for comparison with sample 116, the lowest on our supplemented scale.

75%	of the judges	rated	116	as better	than	C	or	1.0	better
92%	"	"	"	116	"	"	"	B	"	2.0	"
100%	"	"	"	116	"	"	"	A	"	3.5	"

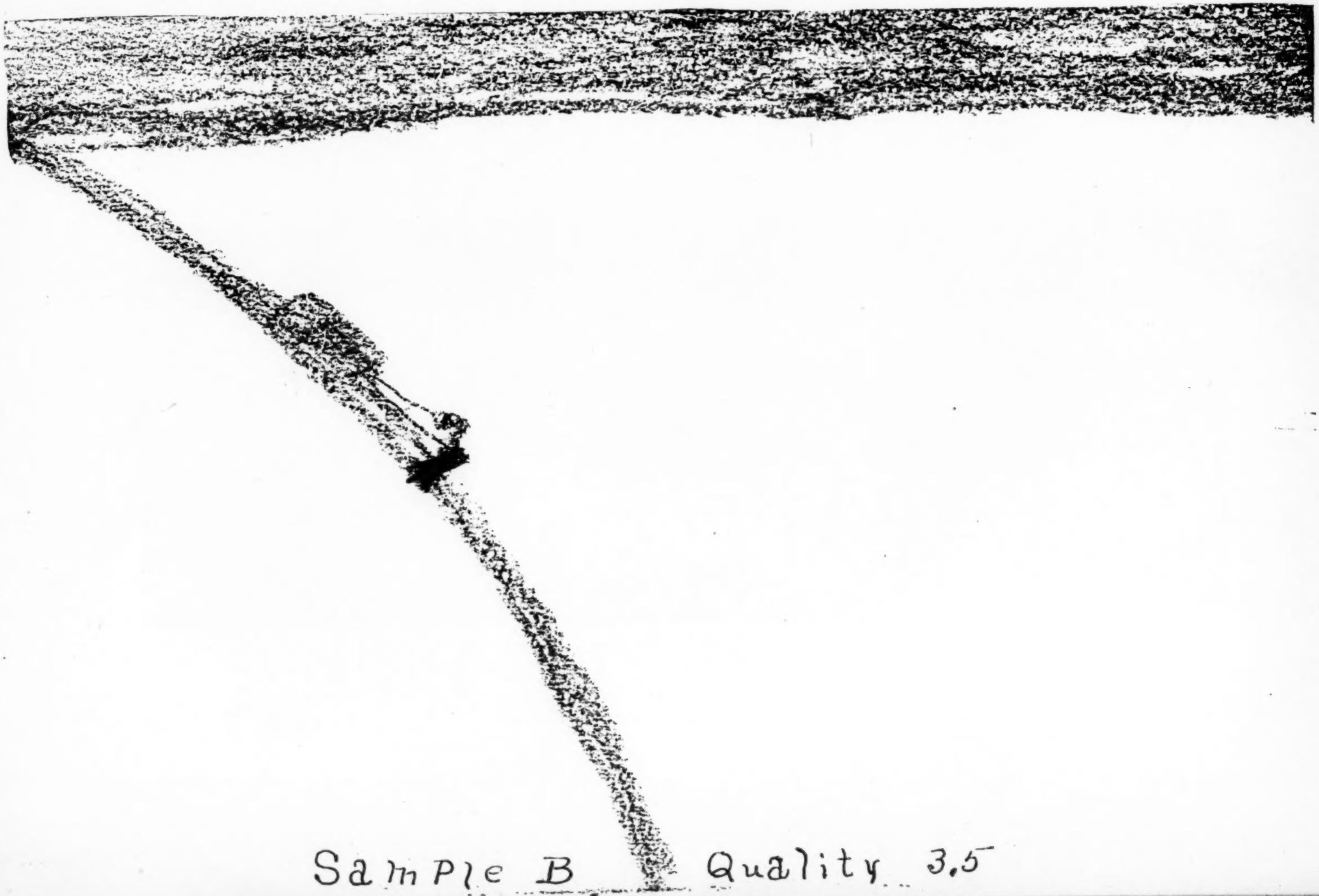
As a result of this comparison samples A, B, and C, given below, are recommended for use with values of 2.0, 3.5, and 4.5 respectively.

The following scale is suggested for rating drawings of snow scenes with human figures in action. With one or two exceptions this is a scale of approximately unit differences, and includes all the human figure samples of the original Thorndike scale.

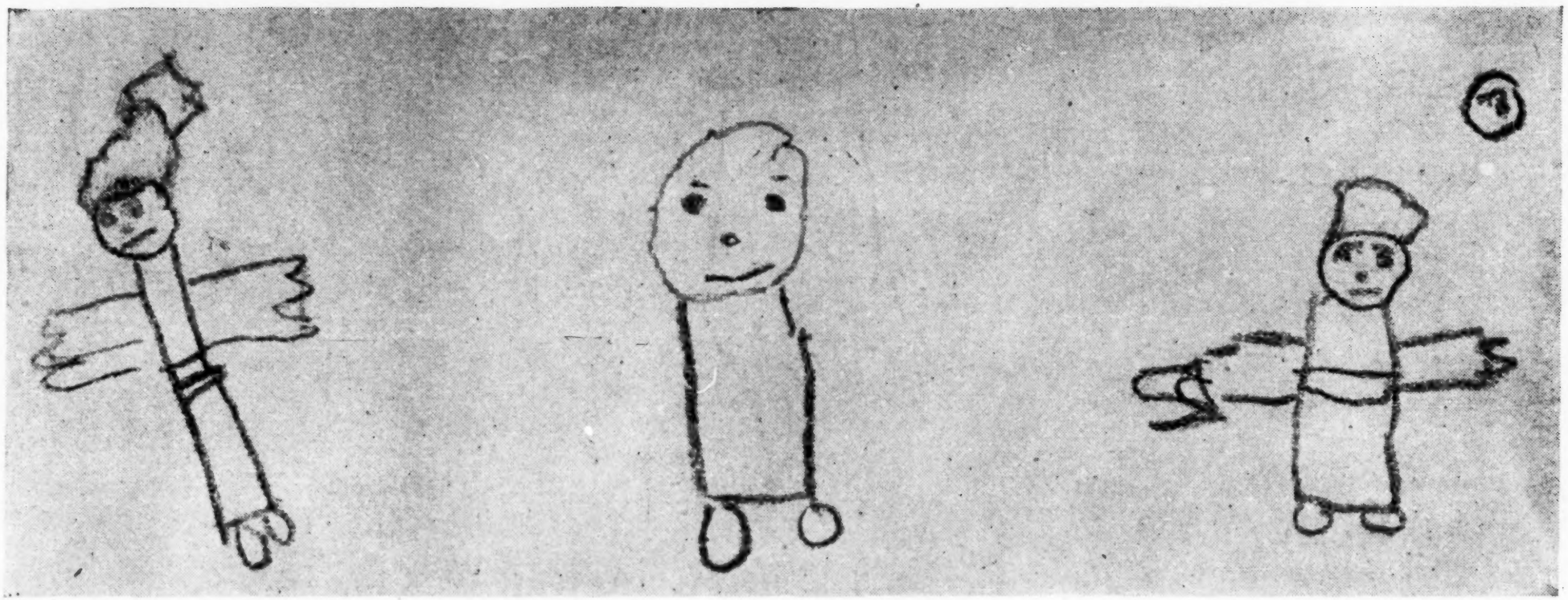


Sample A - Quality 2.0

Sample A - Quality 2.8



Sample B Quality 3.5



SAMPLE C.—QUALITY 4.5

TABLE VIa

Sample	Value	Sample	Value	Sample	Value
T O	0.0	T 6.5	6.5	104	12.9
A	2.0	107	7.6	T 13.5	13.5
B	3.5	T 8.6	8.6	T 14.4	14.4
C	4.5	111	9.3	T 16	16.0
116	5.5	T 10.5	10.5	102	17.6
		108	11.4		

Method of Conducting and Rating the Test.

The drawing exercise was given to one thousand four hundred and five pupils in the elementary schools of system A on February 16 and 17, 1914, and to two hundred eighty-five pupils in the high school, May 26, 1914. As the high school seniors were excused from attendance at this time, this study shows very limited data from them. The test was given to four hundred eighty-seven pupils in one school of system B, April 11, 1914. In system A the exercise was conducted directly by my students in some cases and more frequently by the teacher regularly in charge of the class. In every case the following directions were observed.

In the school of system B the same directions were given under the direction of the drawing supervisor and the teacher.

Directions

1. Materials:
   White drawing paper, 6 x 9, drawing pencil, charcoal or crayon-black only.
2. Preliminary data on the back of the sheet.
   City, school, teacher, pupil, grade, age (years only), date.
3. Ask pupils to do the best they can and not to hurry.
4. Subject:
   Scene or picture with snow on the ground and boys or girls doing something as snowballing, coasting, etc.
5. Be sure pupils understand just what they are to do and the time they are to have for doing it.
6. Time:
   Ten minutes, exclusive of all directions and recording of preliminary data.
7. Collect papers; tie papers of each grade in a package and label with subject, city, school, teacher, and grade.
8. No assistance shall be given any pupil aside from interpreting the instructions and helping to fill in the data on the back of the sheet if necessary.
9. Distribute materials before giving the directions to the pupils.
10. Teachers are not to know in advance the nature of the test to be given.

All papers were rated by my pupils in administration, five in number, the papers being so assigned that the final rating of any grade represented the composite judgment of at least three of the judges and generally four. Each paper was rated by two judges and the ratings averaged.

My instructions to the judges were to determine how well the pupil had done what he was directed to do: viz., to draw a snow scene with human figures in action. The suggestion was made that emphasis should be placed as follows: human figure and action, grouping, landscapes, houses, trees, etc. The scorers were asked to judge largely on the representative features of the drawing.

Conditions Under Which Drawing Is Given in the Schools Tested.

During the year 1913–1914 the schools of system A had no drawing supervisor, the work being carried on by each teacher from outlines previously used. It should be noted that previously to this year the drawing had been supervised. The time given weekly varied from thirty to seventy-five minutes, but fifty and sixty minutes per week seemed to be the length of periods most frequently found on the programs.

In the departmental grades (6A to 8A) and in the high school no time was given to drawing as such.

In system B about ninety minutes per week were devoted to drawing in grades 3A to 8A and seventy-five minutes per week in grades 1B to 3B.

The work was well supervised.

The Results.

The results can be most adequately represented by the tables of distribution, the curves of progress, the central tendencies, and variabilities by grades.

In tabulating results, the exact averages of the two judges on any given paper were not taken, but merely the unit group within which the average fell, e. g., a paper rated 7.2 and 8.0 was assigned to the 7 to 7.99 group.

TABLE VII

Distribution of Drawing Ability—System A, 1690 pupils

	Number of Pupils by Grades																	Per cent. of Pupils Receiving each Score	High School					Per cent. Receiving each Score
Score	1B	1A	2B	2A	3B	3A	4B	4A	5B	5A	6B	6A	7B	7A	8B	8A	Total		9	10	11	12	Total	
0.....	1																1	.07	1				1	.35
1 to 1.99.....	1		1			1											3	.21	1				1	.35
2 to 2.99.....	2		4			1											7	.50	0				0	0
3 to 3.99.....	13	16	18	5		3			1			1					57	4.05	3				3	1.05
4 to 4.99.....	17	7	7	3	1	2		1	2		1	0		1			42	3.00	1		1		2	.70
5 to 5.99.....	11	16	14	3	5	10	1	0	6	3	3	1		0			73	5.20	5	3	2		10	3.51
6 to 6.99.....	27	34	18	23	14	18	15	6	15	13	6	3	3	2		1	198	14.09	6	8	3		17	5.96
7 to 7.99.....	8	22	7	30	25	39	33	10	12	18	12	6	7	2	5	7	243	17.30	18	14	11		43	15.09
8 to 8.99.....	6	19	12	33	39	40	23	57	23	48	42	17	39	24	23	17	462	32.88	20	32	27	4	83	29.12
9 to 9.99.....	1	1		2	7	7	7	13	10	12	9	13	13	31	9	6	141	10.03	19	18	20	0	57	20.00
10 to 10.99....				1	3	3		5	8	9	17	31	7	34	8	13	139	9.89	11	12	15	2	40	14.00
11 to 11.99....								2	0	0		5	1	1	1	5	15	1.07	5	4	6	1	16	5.61
12 to 12.99....								1	0	0		3	1	3	0	0	8	.57	2	2	2		6	2.11
13 to 13.99....									2	1		3			4	1	11	.78	3	2	1		6	2.11
14 to 14.99....												2			3		5	.36						
15 to 15.99....																								
Total.....	87	115	81	100	94	124	79	95	79	104	90	85	71	98	53	50	1405	100.00	95	95	88	7	285	100.00
Median.....	5.91	6.56	5.78	7.50	8.06	7.69	7.73	8.54	8.17	8.38	8.56	10.06	8.67	9.66	8.96	9.00	8.17		8.65	8.72	9.00	8.75	8.80	
P. E.....	1.17	1.11	1.54	.86	.76	.85	.66	.18	1.13	.68	.63	1.07	.55	.72	1.01	1.12	1.04		1.25	.95	.97	1.09	1.04	

TABLE VIII

Distribution of Drawing Ability—One School of System B. 487 Pupils

	Number of Pupils by Grades																Total	Per cent. of Pupils Receiving Each Score
Score	1B	1A	2B	2A	3B	3A	4B	4A	5B	5A	6B	6A	7B	7A	8B	8A	1–8	
0.....							1										1	.21
1— 1.99.....							0	1									1	.21
2— 2.99.....		1	1				1	0					1				4	.82
3— 3.99.....		12	2			3	3	0					0				18	3.69
4— 4.99.....		9	4		1	0	0	0					0	1			15	3.08
5— 5.99.....		15	8		2	3	0	3	1		1	4	0	2			39	8.01
6— 6.99.....		2	14	9	5	11	9	5	2	4	0	3	1	4	1		70	14.37
7— 7.99.....		1	7	8	11	11	5	7	9	11	13	4	0	8	7	2	104	21.35
8— 8.99.....			2	2	7	5	8	7	15	14	18	10	19	16	13	3	139	28.54
9— 9.99.....				3	3	3		4	3	5	4	10	8	3	5	6	57	11.70
10—10.99.....						1			1	3	1	2	2	2	1	7	20	4.11
11—11.99.....										1		2		2	1	3	9	1.85
12—12.99.....												1		1	0	2	4	.82
13—13.99.....												1		1	1	2	5	1.03
14—14.99.....																1	1	.21
Total.....	0	40	38	22	29	35	27	27	31	38	37	37	31	40	29	26	487	100.00
Median.....		4.83	6.32	7.31	7.64	7.27	7.00	7.71	8.27	8.32	8.28	8.80	8.74	8.34	8.54	10.36	7.92	
P. E.....		.89	.82	.66	.77	.76	.98	1.03	.61	.73	.56	1.05	.49	.78	.63	1.12	1.09	

Below is given a summary of the combined results of Tables VII and VIII.

TABLE IX

Summary of Tables VII and VIII.

Grade	1B	1A	2B	2A	3B	3A	4B	4A	5B
Median Score	5.5(?)	6.1	5.95	7.46	7.96	7.60	7.54	8.35	8.20

Grade	5A	6B	6A	7B	7A	8B	8A	All
Median Score	8.36	8.48	9.68	8.69	9.28	8.81	9.47	8.09

From this it would seem that no distinctive norm can be established for each grade, but rather by groups as indicated below.

TABLE X.

Group	Grades	Characteristic Scores
I.	1B	4.5 (?), 5.5
II.	1A, 2B	5.5, 6.5
III.	2A, 3B, 3A, 4B	7.2, 8.0
IV.	4A, 5B, 5A, 6B	8.0, 8.6
V.	6A, 7B, 7A, 8B, 8A	8.6, 9.3

8 to 8.99 is the modal score (the one most often made) by pupils from the 4A to 8A grades inclusive.

No doubt a few periods of practice upon the type of drawing represented by this scale would yield higher scores in all grades if tested by the scale.

Advantages and Limitations of the Scale in Actual Use.

There is no longer any serious question as to the advantages of objective scales for measuring school achievement. Repeated trials have demonstrated that such scales limit the subjective factor in judgment and narrow greatly the range of variability in rating achievement.

It seems to the writer also that it is desirable that the teacher or supervisor of drawing know what quality of achievement the pupils of any grade should attain, e. g., that pupils of the 1B grade should draw snow scenes with action equal in quality to sample 116, and in grade 3B equal to sample 106, etc.

On page twenty-nine of *The Teachers College Record* for November, 1913, Professor Thorndike indicates the most obvious limitation of the scale, viz., that it does not admit of easy and accurate comparison of all types of drawings. This can be remedied only by devising a series of scales covering the various types of drawing, such as human figures, animals, landscapes, flowers, designs, etc.

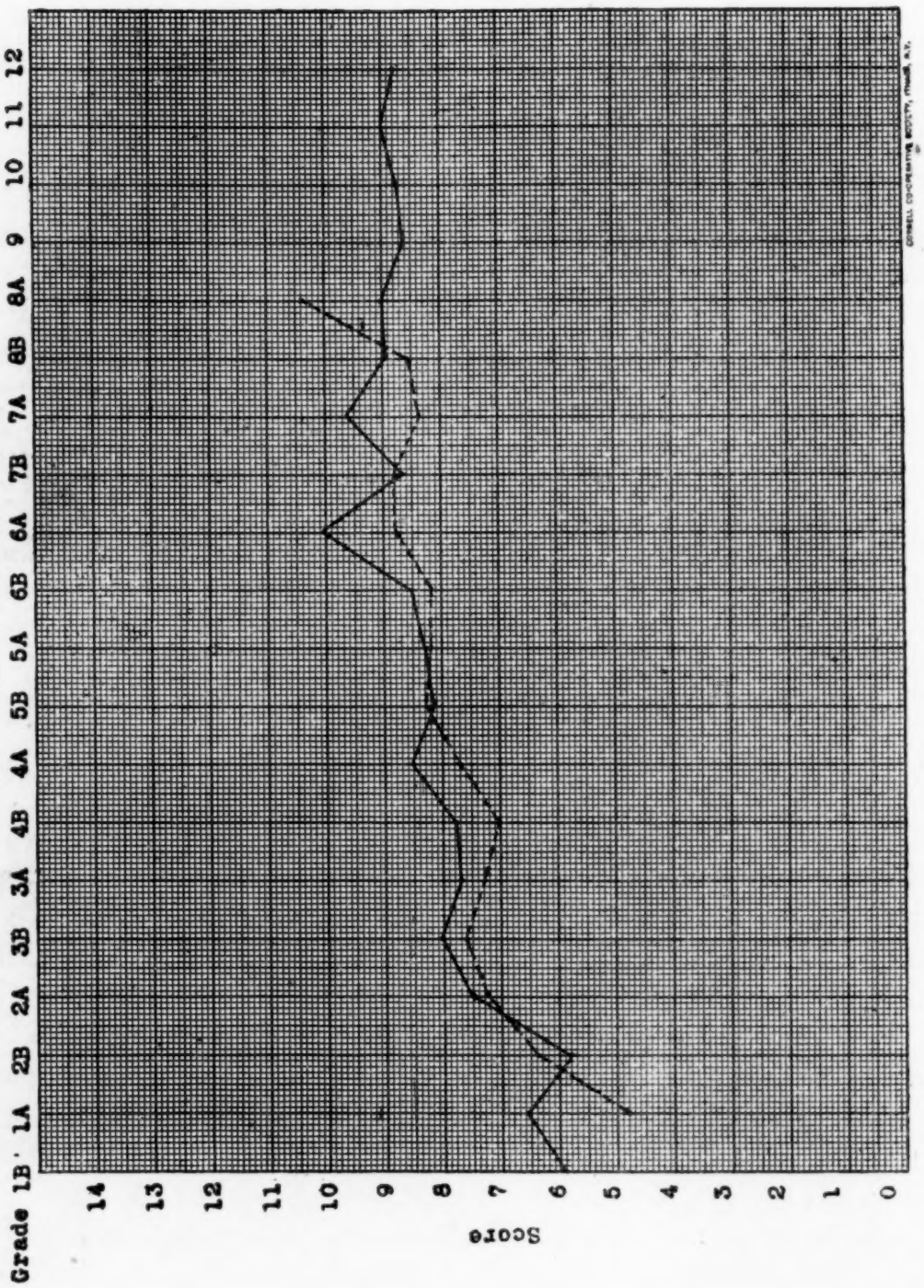
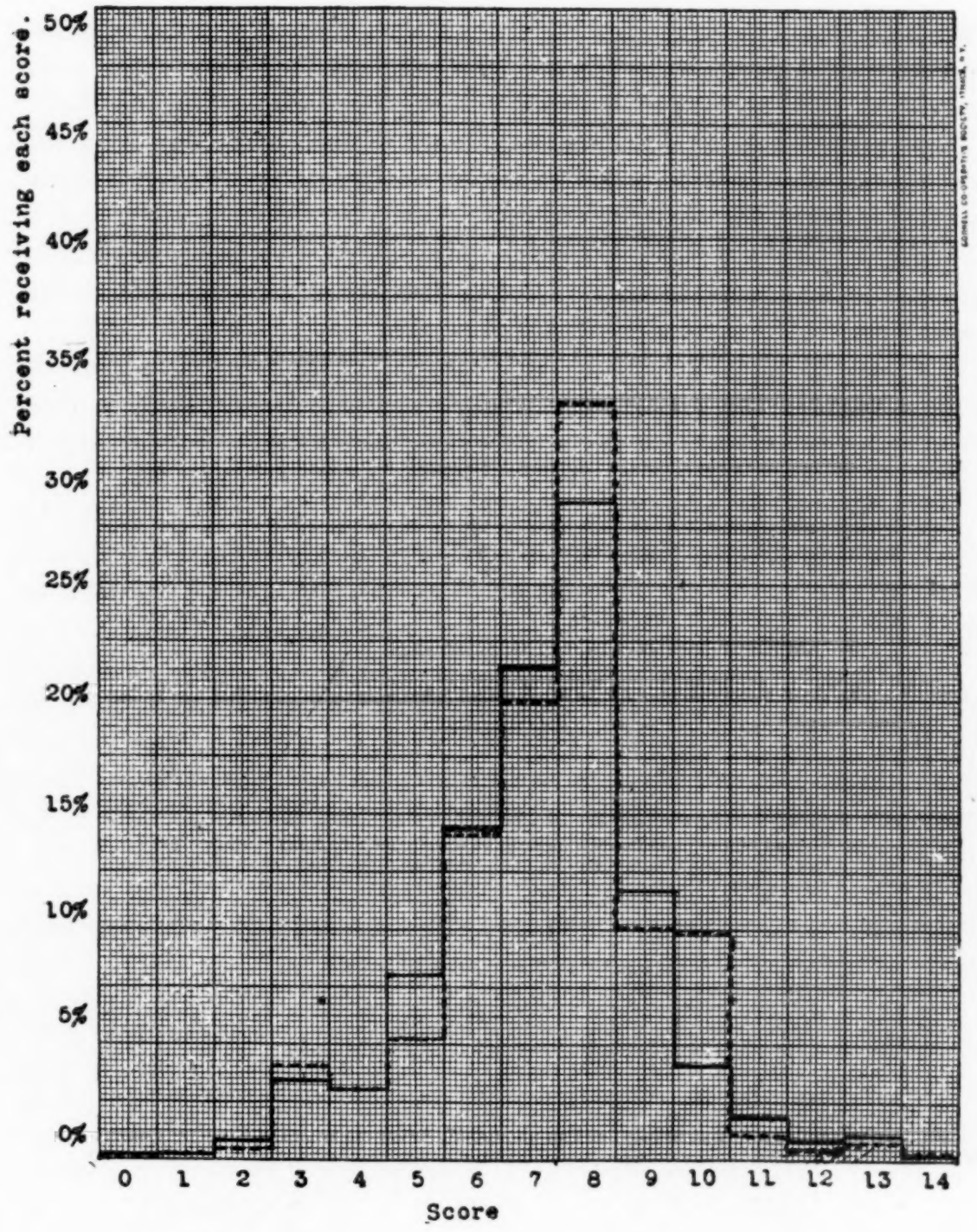

Curve of Progress in drawing ability, based on Tables VII and VIII,
—— System A - - - - - System B
Grade 1B 1A 2B 2A 3B 3A 4B 4A 5B 5A 6B 6A 7B 7A 8B 8A 9 10 11 12
Score
14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

Table XII. Distribution of drawing ability. - - - -System A
_____System B
Based on tables VII and VIII
All grades 1 to 8.



Teachers and supervisors in the schools where these tests were given protested that it was unfair to judge the quality of drawing achievement by a scale based upon a type of drawing which was given but little emphasis in their courses of study. Landscapes and object drawing receive much attention in most systems, but the landscape effects in the Thorndike scale below quality 14.4 are so crude as to afford but little basis for comparison. This feature in the drawings of systems A and B was very pronounced. Landscape effects, even with lower grade children, often compared favorably with the best on the scale, but the figures were inferior.

Many pupils would, no doubt, have made a higher score if the time had not been limited. This objection applies to the conditions of administering the test and not to the scale itself. Here, as in any other field of human achievement, efficiency must be measured both in terms of product and time. Just where to strike the balance must be determined by experimentation.

Another limitation of the scale already referred to is that the scale has no snow scenes with action of quality, 2 to 2.99, 3 to 3.99, or 12 to 12.99, and no samples of any sort, 1 to 1.99 or 4 to 4.99. As a result there are fewer ratings of 4 to 4.99 than there are of 3 to 3.99, whereas a normal distribution of ability should give more. In like manner there are more ratings of 13 to 13.99 than of 12 to 12.99, which should not be with a normal distribution of ability. For verification of the above facts consult Table VII. This shortcoming of the scale may be improved by the use of the scale suggested in Table VIa.

Suggestions Pertaining to the Use of the Scale and the Interpretation of Results.

Those interested in using the scale will find it helpful to sort the papers to be rated into piles such that the papers of any one pile shall be of approximately equal value and perceptibly different from those of the piles of nearest value. This provides the reader with a double set of comparisons; first, of drawings with each other; and second, of each with the standard scale. Then, too, one can work more rapidly, having to use but a limited range of the whole scale in rating any one pile or sample. If teachers are encouraged to use the scale to measure the prog-

ress of their pupils from time to time, more definite standards of achievement and progress will result. Supervisors will find it advisable to do some preliminary work with teachers in the use of the scale. This can best be done with a few selected drawings by calling the teachers' attention to the features to be emphasized in the scale and the drawings. Practice will naturally lead to facility in the use of the scale.

Smoothness of the curve and a marked rise at its end, together with a greater range of gain during the eight years and a smaller range in variation of the product of each grade, are indicative of good supervision. These features are clearly apparent in the curves and table of distribution of system B. The curve of system A is characterized by more ups and downs and a decline from the 6A level of achievement to the end. The range of progress from the 1A to the 8A grades is 2.44 units as compared with 5.53 units in system B, and from the 1A to the 6A grades, 3.50 units as compared with 3.97 units in system B. Systematic supervision, no doubt, accounts for much of the difference found in the two curves of progress. It might be noted, however, that the actual achievement in system A is slightly above that in system B in nearly every grade from 1A to 8B.

Our tables of distribution and curves show that the average child develops more ability in drawing before entering school at the age of six or seven years than he does in the entire eight years of his elementary school course. This statement is based upon the data of Table VII and the fact that 1B drawings were made within four weeks of the beginning of the term.

In both curves the long plateau subsequent to the level reached in grade three is clearly noticeable. This is completely in accord with the studies of children's drawings by Barnes, Lukens, Burk, and Götze, who report a plateau of non-development from the ages of nine or ten on to adolescence.

In the light of these studies and the development of the same fact by the use of the objective scale, it seems pertinent to inquire whether our administrative practice is sound in assigning the same time to drawing in grades four and five as in earlier or later grades where natural development seems to be more marked. In a system having three or four sections each in the fourth and fifth grades, why not assign one section thirty minutes weekly for drawing, another sixty, another ninety, another one hundred

twenty? By adequate testing at the beginning and end of a half year or a year, the progress of each group may be determined.

If thirty minutes weekly produces as good results as ninety, why not assign drawing a minimum of time during these years and appropriate the extra time, now generally given to this subject, to other subjects in which experience has shown that pupils do make rapid progress with the added time? To quote the late Professor James: "Strike while the iron is hot."

Present achievement should be determined by the supervisor for the purpose of planning future improvement. Tables of distribution and curves of progress should stimulate the supervisor to prevent relapses and to eliminate plateaus, to keep the curve ever slanting upward.

The limited findings of this study should not be considered as establishing norms of ability in drawing because they represent only one phase of drawing achievement in a very limited number of schools. These findings are not intended to be final or conclusive in any respect, but it is hoped that these results may be suggestive and helpful to other teachers as to methods of experimentation and as a basis for comparison of achievement.

ATTITUDE AS A DETERMINANT IN SPELLING EFFICIENCY IN IMMEDIATE AND DELAYED RECALL

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I. Introduction

Random information in and out of school points to increased orthographic viciousness. No inconsiderable percentage of university students, with duly attested credentials from accredited secondary schools, present in their written reviews and examinations, models of inaccurate spelling. Various reasons are assigned for this increased deficiency, chief among them being the enrichment of the elementary and secondary programs and the consequent shortening of the time devoted to spelling. Elimination of new subjects, introduced through social necessity, in the interest of spelling is impossible because such subjects represent this generation's advances and needs. If educational procedure is to avoid over-taxation of children and at the same time insure the learning of an increased bulk of information, it appears imperative that educational practice should improve the teaching technique on the one hand and devise more economic methods of learning on the other. The child of the present must learn more economically.

General denunciation, now prevalent, of the inconsistent and irrational forms of the English language by no means meets the difficulty, but may, by the overzealous "confound confusion."[1] It would seem that improvement in the technique of spelling resulting in greater efficiency and economy in learning offers a desirable auxiliary to conservative orthographic reform.

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[1] The *Unpopular Review*: "Az tu the long sowndz, the oonly way tu reprezent them, whair thay ar not determind by pozishon at the end ov an oopen silabl, iz (az allreddy illustrated) by combining the letrz with different letrz, az we combiin in gain, real, mine, soar, rule; evidently gan, rel, min, sor, rul, woud not answer the purpus."

No doubt orthographic reform in the way of elimination of useless letters is the shortest cut toward greater accuracy. But complete simplification to a pure phonetic basis is doubtful economy. Confusion and inconsistency are not eliminated by drastic phonetic reformation. The direction and extent of the reformation is evidently the task of the philologist; improvement in pedagogical technique would seem to be the domain of the educator. That the task of verbal simplification will be left to the philological expert and that the educator will confine his activity to the development of principles underlying the technique of spelling is asking too much of an age yet two-thirds scornful of expert guidance.

II. Purpose

The following observations of a six and one-half year old boy is an attempted analysis of certain factors in orthographic technique present in a child's initial spelling work. It should be said that the boy tested out seven and one-half years, according to the Binet-Simon test, and that he is now spelling with reasonable ease the ordinary list of words found in Jones's Third Reader. It should be added that less time was devoted per day than is usually given to exercises in spelling in the primary grades of the public schools.

The purpose of the experiment is to determine: (a) whether pupils in their initial spelling work should be permitted to form a general attitude toward a group of assigned words, or, (b) whether an independent specific attitude toward each word of a group should be developed. The characteristic feature of "a" consists in a definite spacial and temporal relation of the words of an assigned lesson. What is the recall value of such a procedure as compared with a procedure in which each member of a group of assigned words is relatively independent of any such spacial and temporal orders?

Points "a" and "b" above may be illustrated by the following list of words:

1. missed	3. jackstraws	5. kennel	7. photographs	9. march
2. smell	4. evening	6. dominos	8. kingdom	10. games

It is obvious in the above list of words, as in any ordinary formal group of words found in our common school readers,

that the group associates and the spacial order of the words are entirely accidental. There is no reason why any other order or any other words of equal difficulty might not with equal propriety and educational value be chosen. Of what advantage or disadvantage are the accidental features of a given list of words in recall—immediate, temporary, or permanent? It is probable that each grouping in a given list of words has the same recall value as any other possible grouping of this list. It is probable, too, that any grouping whatsoever has only a temporary recall value. The fact that "missed" has the top space relation to "smell" has little, if any, permanent recall value, for the use of either word in meeting future situations may never involve the other in just this relationship. But experiment shows that this relationship has a temporary functional value in recall. What is true of the spacial order holds equally for the temporal order—both orders constituting accidental features in memorial imprinting and subsequent reproduction.

III. Experimental Data

The groups of words employed in this experiment are found in Jones's *Second Reader.* Not more than one group was assigned for any one lesson whether the group contained many or few words. In the first lesson the order given in the reader was followed in the assignment, in the study period, and in recall. On page 10, for example, the following group of words is found:

1. bumblebee	3. din	5. purple
2. boom	4. need	6. rover

According to the first procedure the words are assigned, studied, and recalled in the order indicated by the prefixed numbers. In the second lesson the words were considered during the assignment and study period in promiscuous order and recalled in chance order. The third lesson proceeded as in the first, the fourth as in the second, and so on through the reader. Close supervision during the study period insured the maintenance of these conditions. In the first case the procedure may be termed orderly assignment, orderly study, and orderly recall; in the second case the procedure is random assignment, random study,

and random recall: The latter procedure more nearly parallels conditions of recall operative under actual situations of life. Obviously orthographic recall in actual situations has neither spacial nor temporal references such as are found in the former procedure.

One group of words was taken per day and at approximately the same hour. Upon completion of the reader the words were again recalled under similar conditions, but this time without previous study. Each group of words was twice recalled: first, immediately upon completion of the study period; second, subsequent to the completion of the text. Before taking up a new group of words the learner was required to reproduce correctly all of the words of a given group. Consideration of an assignment was complete upon the first correct reproduction of the entire list of words.

With words of the chance order grouping, attention was occasionally centered in a conversational way upon the importance of learning the words for "all time." Even at this early age some degree of attention to permanent retention appeared awakened in the mind of the learner, and it is not improbable that the effect of this attitude, however indefinite, manifested itself in greater efficiency in the reproductive process.

IV. Results and Discussions

A total number of one hundred four groups of words were studied (Table I), fifty-four according to orderly procedure and an equal number according to random procedure. The following statements briefly summarize the results:

(a) *In Immediate Recall*

1. Total number of errors for all groups of words.....73
2. Number of errors when the procedure is orderly.....33
3. Number of errors when the procedure is random.....40
4. Excess of errors of "3" over "2"..... 7
5. Percentage advantage of "2" over "3"..... 9.4
6. Average words wrong 0.1; P. E. .07.

(b) *In Delayed Recall*

1. Total number of errors for all groups of words.....249
2. Number of errors when the procedure is orderly.....145
3. Number of errors when the procedure is random.....104
4. Excess of errors of "2" over "3"..... 41
5. Percentage advantage of "3" over "2"..... 16.4
6. Average words wrong 0.31; P. E. .11

(c) *Comparison of* (*a*) *and* (*b*).

1. Total number of words constituting the experiment	808
2. Total number of groups of words (separate lessons)	104
3. Errors in delayed recall times greater than in immediate recall (orderly procedure)	4.33
4. Errors in delayed recall times greater than in immediate recall (random procedure)	2.6
5. Relative advantage of the random method times that of the orderly method	1.73

In the case of immediate reproduction, the orderly procedure is more efficient by 9.4% than the random procedure; in the case of delayed recall the efficiencies of the two methods are reversed —the random exceeding that of the orderly procedure by 16.4%. The advantage of the random method over that of the orderly in delayed recall as compared with the advantage of the orderly method over that of the random method in immediate recall is not adequately represented by the absolute values standing for the respective advantages of the two kinds of recall. Relatively, 1% advantage of the 16.4% has a higher practical significance than 1% of the 9.4% in so far as the former represents fairly permanent mental acquisition. The superiority of the orderly method in immediate recall is in large part due to the functional participation of accidental factors in perception. Chief among such factors are the spacial and temporal arrangements, which happen to prevail, in a given group of words. The superiority of the random method in delayed recall is in large part due to the fading away of the accidental factors which accompany the original learning according to the orderly method. These factors apparently serve an immediate need, then fade rapidly and almost wholly fail to function in delayed recall. According to the random method no such artificial crutch attends the original learning and therefore reproduction remains unaffected by its absence in delayed recall.

V. Observations and Conclusions

From the foregoing the assignment of a spelling lesson and the study period gain enormously in importance. The results of the experiment show that a part of the time of an assignment should be devoted to the prevention of the formation of fixed spacial and temporal arrangements of the words of a lesson. Such arrangement can serve no useful purpose in future recall. When, for example, an assignment is made in general terms

TABLE I.

No. of Group	No. of words in group	No. of misspelled words in group—1st attempt, immediate restoration	Per cent. of errors in group—immediate restoration	No. of misspelled words in group—delayed recall	Per cent. of errors in group—delayed recall
1	5			2	40
2	5	1	20	2	40
3	6			2	33
4	6	1	20		
5	5	1	20	3	60
6	7			1	14
7	12	3	25	4	32
8	5			2	40
9	5	1	20	2	40
10	5			1	20
11	7	1	14		
12	7	2	28	3	43
13	4			1	25
14	7	1	14	2	28
15	5			2	40
16	7	2	28	2	28
17	3				
18	4			1	25
19	6	1	16	3	50
20	10	1	20	2	40
21	2			2	100
22	5	1	20	1	20
23	3			1	33
24	6	1	16	2	33
25	7			3	43
26	6			1	16
27	8	2	24	2	24
28	6			1	16
29	10	1	10	4	40
30	11			2	18
31	9	1	11	4	44
32	10	2	20	2	20
33	8			2	24
34	7				
35	7			1	14
36	7	1		2	28
37	3			1	33
38	8			1	12
39	6	1	16	1	16
40	8	1	12	2	24
41	5			1	20
42	5			1	20
43	11	2	18	5	45
44	6			1	16
45	2			2	100
46	8	1	12	2	24
47	10	1	10	4	10
48	4			1	25
49	3			1	33
50	12	2	16	1	8
51	10	1	10	4	40
52	7	1	14	3	53
53	5			3	60
54	8				
55	12	2	16	4	33
56	10	1	10	5	50

(TABLE I—*Continued.*)

No. of Group	No. of words in group	No. of misspelled words in group—1st attempt, immediate restoration	Per cent. of errors in group—immediate restoration	No. of misspelled words in group—delayed recall	Per cent. of errors in group—delayed recall
57	10			4	40
58	13	4	31	3	22
59	10			3	30
60	7	1	14	3	43
61	8	1	12	2	25
62	5			1	20
63	11			2	18
64	6			3	48
65	7	1	14	2	28
66	6			1	16
67	10	1	10	3	30
68	10			2	20
69	7			2	28
70	9	2	22	3	33
71	10			3	30
72	9			1 (83)	11
73	12	1	8	4	33
74	10	2	20	2	20
75	8			3	37
76	4			1	25
77	13	2	15	6	46
78	11	2	18	6	54
79	10	1	10	4	40
80	11			2	18
81	10	1	10	3	30
82	6			1	16
83	14	3	21	4	28
84	9			2	22
85	9			4	44
86	6			2	32
87	11	1	9	4	36
88	10	1	10	2	20
89	6			3	50
90	7			2	28
91	11			2	18
92	9	2	22	4	44
93	5			3	60
94	3			2	66
95	10	1	10	3	30
96	6	1	16	3	50
97	10			4	40
98	11	2	18	3	27
99	14	1	7	6	43
100	13	2	15	4	31
101	10	1	10	5	50
102	6			3	50
103	5			2	40
104	14	2	14	4	28
	808	73		249	

Number of words spelled according to orderly procedure = 410.
Number of words spelled according to random procedure = 398.
Fractions neglected.

Odd numbered groups indicate a general, orderly attitude on the part of the learner. Even numbered groups indicate an individual, random attitude on the part of the learner toward the separate words of a group.

such as "take the group of words at the top of the next lesson" to a class of primary pupils, a group attitude is established in which each of the words stands in a fixed space and time relation. Observation shows that this attitude is, within certain limits, maintained throughout the study period and carried over to the reproduction period. It is believed that the group attitude interferes with the pupil's independent analysis of each word during the study period and with recall during the recitation period. Accurate observational noting under the direction of the teacher is the first effective imprint received by the child. The effectiveness of subsequent impressions during the study period when the direction of the teacher is withdrawn will depend much upon the first impression. The assignment should be made in such a way as to insure specific adjustment to, and accurate noting of, each individual word of the group, dropping away, as it were, from the other words of the group. This may well be done by focalizing the pupil's attention on each separate word but in no particular space order. Moreover, the teacher should insist that no particular order be followed in learning during the study period.

Children, if left to their own devices, learn a series of words according to the order laid down in the text. If recall follows the order of learning, the efficiency for a given recall period is usually high; if the order of recall is varied, or there is no definite order, confusion is introduced and efficiency disturbed. The definite space order scheme has a relatively temporary learning value as is evidenced by the general inefficiency in subsequent reproduction in reviews.

The above list of words was learned in the order indicated by the numerals. When "March" in the reproductive order followed "missed" the pupil was at sea, confused, as is indicated by the statement, "I was thinking of 'smell.'" Obviously we find here the order of learning interfering with the independent consideration of the word "March." This case is typical of a large number of similar observations. It appears that words should be learned at random, that is, independent of all associates other than the phonetic associates, unless such other associates form permanent and meaningful connections. It is clear that "missed" and "smell" form a unique, temporary, and accidental contiguity which can by no means function as an

agent of recall in future situations. Such arbitrary contiguities function positively for a given spelling assignment, but the total final effect is negative in that they interfere with the establishment of clear and definite phonetic connections of the literal elements of a word. In fact, reliance on contiguity acts as a distraction to clear phonetic apprehension.

Observation shows that economy in learning to spell demands that each word be hoisted out of its group setting for the reason already given and for the equally or more important reason that by so doing the literal elements of a word are brought out into clearer consciousness and their phonetic connections established. The importance of raising the sounds and their connections into clearer consciousness by means of the assignment is obvious from the repeated confusion of the letters "m" and "n," "j" and "g," "in" and "m." The word "missed" was studied and reproduced as "nissed"; "jackstraw" as "gackstraw"; "games" as "gains." These cases clearly indicate the necessity of attentive focalization on the structural elements of each word prior to the study period if progress in spelling is to be economic, rapid, and permanent. In this connection it should be remembered that a single focalization by no means establishes the phonetic associates of a given word. Repetitive focalization is best secured by having several pupils successively pronounce and phonetically spell in irregular order the various words of a given group. The profit of the study period is proportional to the care with which this part of the assignment is carried out. It is perhaps safe to say that one-half of the time devoted to second grade spelling should be devoted to the assignment.

VI. Summary.

1. Within the limits of this study a group attitude toward a given list of words is more efficient in immediate and less efficient in delayed recall.

2. An individual, particular attitude toward each member of a group independent of spacial and temporal relations is more efficient in delayed recall and less efficient in immediate reproduction.

3. Whether the orderly or random method is preferable depends upon the end or purpose of the learning. If the end is

a perfect recitation without regard to lasting effect, then the orderly procedure saves time and energy and should be followed; if, however, the end is permanent retention and accuracy in reproduction, then the random procedure should be followed. Here as elsewhere in educational technique the purpose in learning determines the method. A given method of learning may be economical when one effect is desired and uneconomical when another effect is sought.

A STUDY OF INITIAL SPURT IN THE CASE OF ADDITION

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The object of this paper is to present evidence of the existence of initial spurt as a characteristic of mental work of a certain type This doctrine of initial spurt may be stated thus:—At the very commencement of work, other things being equal, the individual tends to exhibit his maximum efficiency.

This theory has been investigated by many experimenters, who have reached such divergent results, usually negative, that a description of their work would be cumbersome. In Thorndike's recent book,[5] there is a reasonable discussion of the subject, and the important references are given. A consideration of the complete evidence leads to the conclusion that one cannot be other than extremely skeptical concerning the existence of such a spurt. The subject is usually so mixed up with accidental variations as to make it easy, by selection, to interpret these as a general law. Thorndike seems to think that the attractiveness of the theory has led to a false support.

It appears that the weakness of previous experiments lies in two facts, which sometimes occur singly, more often together. These two weaknesses are:

1. The successive time periods which test the spurt are too lengthy.

2. There is usually a lack of a sufficient number of subjects.

The general explanation of initial spurt would be that the individual commences work with a too exacting standard, only to find in a short time that he is compelled to relax this standard. If this is the case, it would appear that from the point of view of investigating this effect, it is impossible to measure too short periods over which the initial spurt may show itself. It is possible

[5] *Educational Psychology.* Vol. III. 47, 48 ff.

that this spurt only lasts for two minutes, or a minute, or even less; self observation, on the part of the writer, would suggest that three minutes in typewriting is enough to eliminate the major part of the effect. It is obvious, therefore, that what has to be done is to measure continuous work over a long period divided up into spaces of time as short as possible consistent with having a sufficient score and not harassing the subjects in their work. A balance between these two factors has to be found. An experimenter using ten-minute successive periods as the test of initial spurt may be compared with an engineer measuring the acceleration of a train by computing the distance covered in successive periods of one hour.

Another factor of importance is the number of the subjects employed. The work of three subjects as in the case of Lindley's[6] experiment, and of one subject in Arai's experiment,[7] can hardly yield results sufficently conclusive for the establishment of a general psychological principle. In the work about to be described, an attempt has been made to eliminate both of the weaknesses mentioned.

Forty-six male college students worked at addition of columns of ten one place numbers for ten ten-minute periods. The addition blanks used were those devised by Thorndike.[8] In the case of each subject the work spread over five days, the two periods each day being separated by a two hours' interval. The test was conducted using four subjects a week, in this manner spreading over a period of twelve weeks. In every case, on a day previous, the test was practised and the routine made automatic. The fact that the test was administered to so few at one time, and that arrangements were made for practice before the actual tests were given will perhaps account for the fact that not a single paper has had to be neglected through lack of obedience to instructions. The results of the previous day were announced, and interest and competition appeared to be at a maximum. The subjects had no idea that the object of the study was to investigate initial spurt.

Seven sheets of these columns of ten one place numbers were used, each sheet containing 48 columns. The various sheets

[6] *Ueber Arbeit und Ruhe.* Psychologische Arbeiten. Vol. 3, pp. 482-534.
[7] *Mental Fatigue.* Teacher College. Contribution to Education. No. 54.
[8] *Practice in Case of Addition.* Amer. Journ. Psych. Vol. 20, p. 364.

were used in rotation. This was necessary to eliminate the possibility of memorizing. The method of conducting the experiment was as follows: after the sheets had been distributed, they were turned face down, at a signal they were reversed, and the subjects commenced to add for a continuous ten-minute period. At the end of each two minutes of that period, the word "mark" was called, at which signal the subjects made a short mark or tick on the right hand side of the problem on which they were engaged. This marking was practised so as not to interfere with the adding, and in working it was found that after a few minutes of practice it became quite automatic. It was hoped that this tick would tell not only the column reached but also the point in the column at which the subject was working when the call was made. This, however, proved not to be the case, since it was found later that some individuals add up the columns and some down, while some add up one column and down the next. The place of the ticks is therefore of no significance apart from indicating the column itself; for this reason allowance has to be made or what may be called the boundary condition. This constituted a correction for the "beginning and end effects." For example, if the first tick came on the right hand side of the xth column, this does not mean that, on the average, x columns have been added, but merely x minus one-half columns; so that half a column is deducted throughout from the first apparant score while three-quarters of a column is added to the last apparent score, for the last score includes one-half of the column on the left hand side of the tick for the fourth period, and an additional correction for the end effect at the close of the fifth and last period. Under ideal conditions, this end effect would be an additional one-half column, beyond the last column completed, for no tick was made at the completion of the ten minutes. In practice, however, the subject who has completed, let us say, half the column when time is called does not cease work instantaneously, but continues for the second or so required to finish that column; only the subjects who have just started the column stop immediately, so that on the average it is probably sounder not to allow half a column but merely a quarter, or possibly less. If the correction is assumed to be three-quarters of a column, the data given in the tables result. The scores are recorded on the basis of columns added correctly, an error in a column simply

means that this column is neglected. Working with subjects of this type, whatever the convention with regard to errors, they are so small in number, as not to affect the topic under consideration.

Using the time distribution previously mentioned it will be seen that each of the subjects is tested on ten occasions for ten minutes, each continuous ten-minute period being divided into two-minute periods, without interfering with the continuity of the work of the ten-minute test. In this way, results are obtained showing the number of columns added during each of the five two-minute periods. Owing to chance variations in each individual score little value attaches to one single score during a single two-minute period; for this and other reasons only the aggregate scores of each subject in the ten-minute periods are given. By adding up the scores of any particular subject, during the first two minutes in all ten tests, an estimate is obtained of the average efficency of that individual during this first period. In the same way, measures can be obtained of the efficiencies during the second, third, fourth, and fifth periods. In Table I such addition of the scores has been made. The left column indicates the number of the subject, while the five columns record the aggregate score in all the tests during each of the two-minute periods mentioned. The Roman numerals, I, II, III, IV, and V, indicate the scores during the first, second, third, fourth, and fifth two-minute periods respectively.

TABLE I.

Total Scores of 46 individuals in addition for five continuous two minute periods on ten occasions

Subject	I. Score 0– 2 mins.	II. Score 2– 4 mins.	III. Score 4– 6 mins.	IV. Score 6– 8 mins.	V. Score 8–10 mins.
1	139	129	134	131	124
2	136	132	125	125	135
3	249	230	220	215	222
4	134	131	127	114	116
5	201	187	178	177	182
6	137	131	130	119	119
7	225	191	194	181	191
8	123	108	117	120	107
9	127	114	112	117	113
10	192	159	153	158	145
11	131	97	97	94	99
12	141	117	132	117	120
13	263	238	232	231	128
14	182	175	174	178	171
15	175	158	142	132	144
16	228	216	208	199	105
17	100	97	103	97	97
18	111	104	102	91	93
19	104	103	102	98	93
20	174	156	156	148	148
21	178	167	156	164	157
22	137	133	120	126	118
23	143	134	126	126	131
24	132	135	130	121	113
25	129	109	117	110	98
26	95	100	101	104	87
27	233	217	208	206	205
28	172	175	165	170	154
29	164	145	142	147	138
30	161	147	141	126	144
31	158	148	137	150	148
32	87	105	95	85	96
33	141	120	115	118	113
34	101	87	88	83	82
35	89	79	84	80	72
36	218	214	207	204	203
37	121	104	92	87	86
38	217	207	192	192	184
39	164	146	143	144	138
40	187	175	159	169	168
41	203	188	182	182	175
42	146	143	127	122	126
43	157	141	121	129	131
44	149	138	130	135	131

Subject	I. Score 0– 2 mins.	II. Score 2–4 mins.	III. Score 4– 6 mins.	IV. Score 6– 8 mins.	V. Score 8–10 mins.
45	158	150	147	137	139
46	236	218	210	207	205
Total	7348	6798	6573	6468	6397

At the foot of the table will be found the grand totals, showing the aggregate work accomplished, during each two-minute period, by the 46 individuals, each working on ten occasions.

In the diagram, Fig. 1, a curve is drawn exhibiting the relation between the order of the two-minute period and the total work accomplished by all the subjects during that period. The curve represents the results corrected for beginning and end effects, according to the convention described.

The curve reveals the undoubted tendency to a greater efficiency during the earlier periods. In the table below, the scores during each of the two-minute periods are shown, the score of the first two-minute period being taken as 100.

TABLE II.

Period	Score
0– 2 min.	100
2– 4 min.	92.5
4– 6 min.	89.4
6– 8 min.	88.0
8–10 min.	87.1

From this table, it will be seen that there is a much greater drop in efficiency from the first to the second period, than from the second to the fifth period, which seems to indicate the presence of a factor which can only be called initial spurt.

These data were collected for other purposes than the investigation of initial spurt effects. Had the latter been the only consideration the total time period would have been longer, so that the subjects might have reached the steady state of efficiency which all other experiments on this subject have revealed. Even in so short a time as ten minutes the curve shows that the decrease in efficiency is rapidly declining.

The subjects were not told, though doubtless in many cases they knew, that the fifth two-minute period was the close of each test: such being the case, these results cannot be used to investigate the problem of "end spurt."

It is interesting to record in what percentage of the forty-six cases, the scores of one particular period exceeded those of the following period. In the table below such results are tabulated.

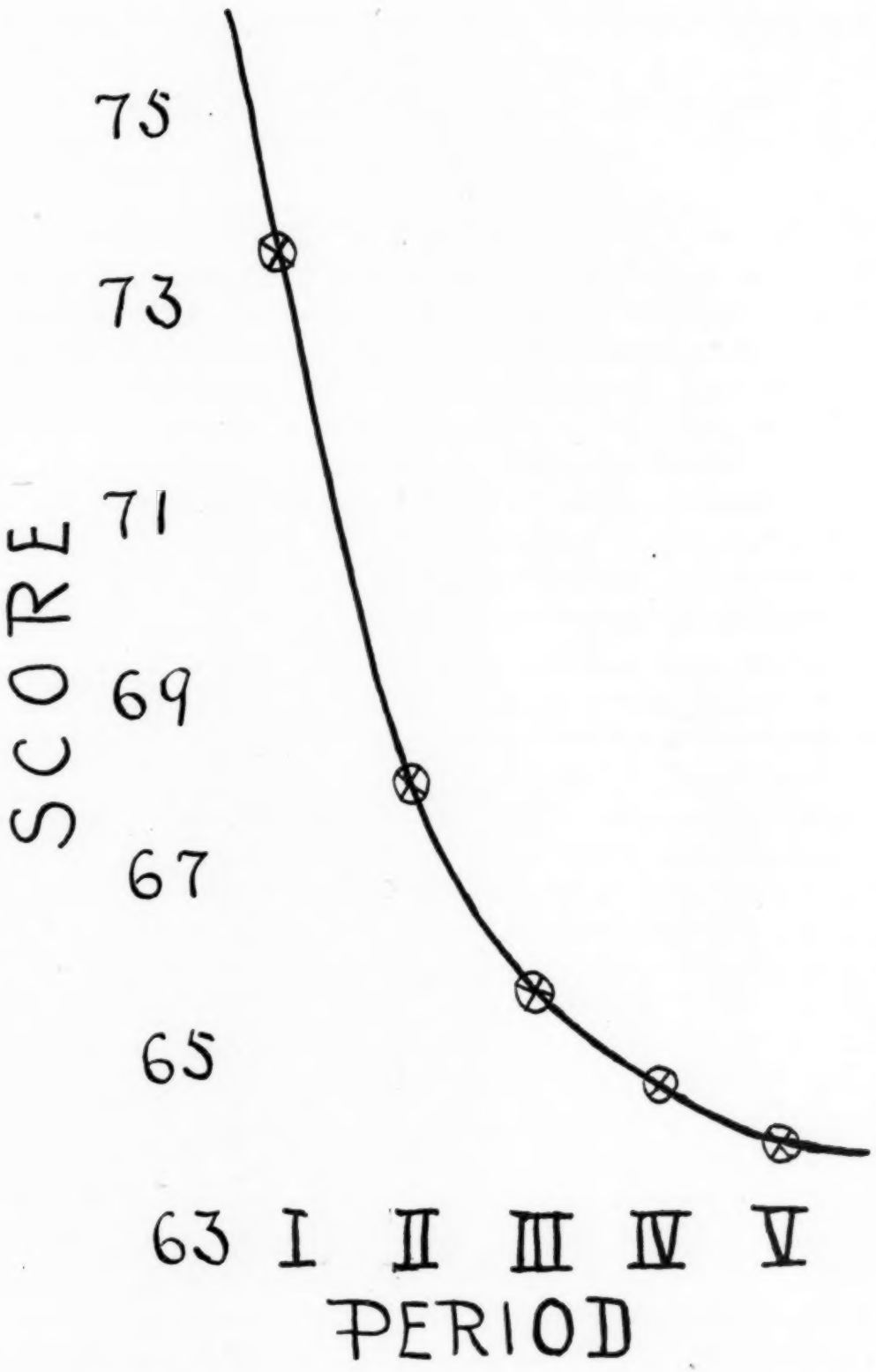


FIG. 1

TABLE III.

Score	I	exceeds score		II	in the case of				91%	of the	subjects	
"	II	"	"	III	"	"	"	"	76%	"	"	"
"	III	"	"	IV	"	"	"	"	59%	"	"	"
"	IV	"	"	V	"	"	"	"	54%	"	"	"
"	I + II	"	"	III + IV	"	"	"	"	94%	"	"	"
"	I + II	"	"	IV + V	"	"	"	"	100%	"	"	"
"	II + III	"	"	IV + V	"	"	"	"	86%	"	"	"

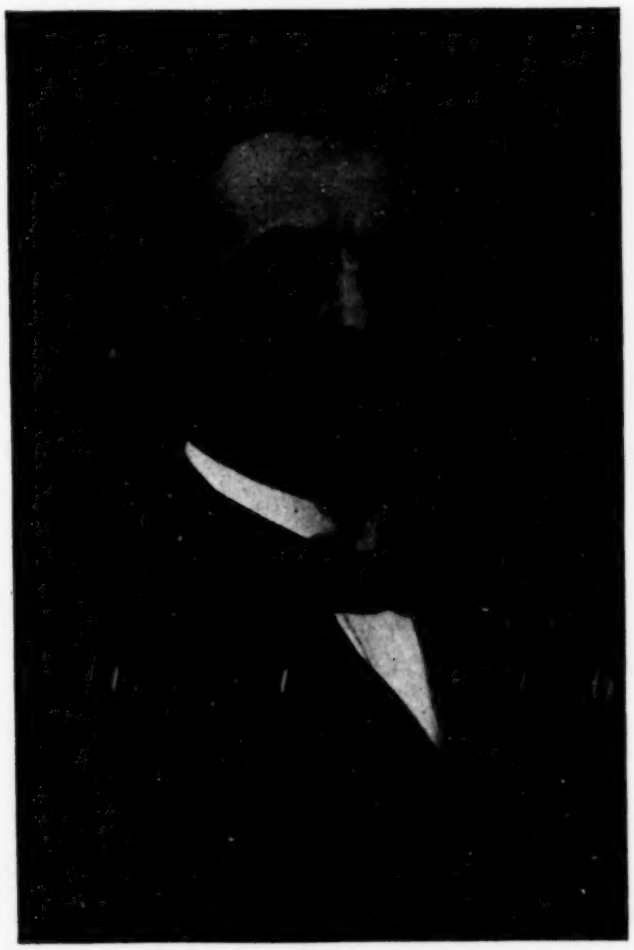
The evidence presented in the case of this particular mental function can only lead to one conclusion, namely, that initial spurt takes place as a general rule in this trait. No explanation on the basis of chance variations will account for the above figures. In such circumstances, however impossible it may be to generalize and predict the presence of initial spurt in all types of work, to dismiss it merely as an attractive theory is to cause greater difficulties than to accept it as a general proposition. The evidence would probably be even more conclusive, were it possible to use shorter periods as the test of initial efficency. This subject is being further investigated.

My thanks are due to Prof. E. L. Thorndike, under whom this research was performed. I also take pleasure in expressing my obligation to the New York State Ventilation Commission for their courtesy in allowing me to use the data recorded.

COMMUNICATIONS AND DISCUSSIONS

ERNST MEUMANN. AN APPRECIATION

Of late the mortality among psychologists of leading rank has been very high. In the last few years we have lost Ebbinghaus, James, Binet, and now Meumann. And the loss is all the greater in that these men were for the most part in their prime. Thus both Binet and Meumann were just a little over fifty, and Meumann was at the stage where he was just beginning to avail himself of his extraordinarily wide knowledge of the literature of educational psychology and several more or less remotely allied subjects, such as pure psychology and aesthetics.



In such an article as this I only need to mention his various articles on learning, memory, aesthetics, etc., and his monumental work on experimental pedagogy, the second revised and much enlarged edition of which he had just completed under somewhat hurried and adverse conditions due to the beginning of the war. His method of writing this second edition was characteristic. As a result of his desire to include everything that had appeared up to the date of publication, he had to do most of his work under hurried conditions, and thus he dictated almost all his material. This accounts for a certain diffuseness of his style. He himself was only

too well aware of this, as was shown by a remark that he once made in rather a hopeless tone of voice, that he would be satisfied if only he could sit down and completely rewrite the second edition without the necessity of including any new material. As another example of his desire for completeness, his review in the *Archiv* of articles on the Binet tests may be mentioned. He actually attempted to read all the articles at first hand in four or five different languages, and he used to shake his head and sigh whenever one of the American periodicals came in with a fresh batch of Binet articles; he had a whole bookcase full of such articles. Of course this desire to include everything carried with it a failure to exercise critical selection in some cases.

Meumann was not only theoretically a pioneer in the new science of experimental pedagogy in Germany, but by his very varied academic career he served to break the ice for the actual practical establishment of experimental pedagogical seminars. Thus in his comparatively brief career he made the following changes, from Leipzig to Zurich, to Königsberg, to Münster, to Halle (as Ebbinghaus's successor), to Leipzig, and finally to Hamburg. In addition to this he gave to numerous teachers' associations throughout Germany series of lectures which formed the basis of his largest work.

As an investigator and student he was an absolutely indefatigable worker, and his early death was in a large measure due to the fact that he did not know how to rest. He was always planning to take vacations, but when the time came round he usually had so many irons in the fire in connection with his many interests that instead of resting he worked all the harder because of the lack of interruption by lectures and class work. Even his one hobby of collecting Oriental carpets was pursued with the same untiring energy. Any one who visited him in his later days will always remember him as working hard to explain the points of difference in the various kinds of carpets, and showing the course of their development with regard to pattern and workmanship.

As a teacher he was unusually stimulating. As one of his students once said, "Meumann could in five minutes propose enough material for two or three doctor's theses on almost any topic in his field." The greatest difficulty that most of his students had was in picking out a sufficiently restricted problem from the wide-reaching suggestions that were made, in order to have even a remote chance of completing the work in the time allowed. This enormous breadth of

view is shown all through Meumann's own work. From his own doctor's thesis on he was always outlining and intending to carry out a far more inclusive investigation than he or any other man could hope to accomplish in a lifetime. But even though he did not himself carry out these proposed lines of research, the outlines for future work constitute his chief contribution to the progress of the new science of pedagogy. He has been accused of scattering his energy over too many and too diverse fields, but in this very scattering lay his chief opportunity for far-reaching influence. His task was to break new ground; it is for those who follow to see that this pioneer work is properly carried out to its logical conclusion.

As a man Meumann was the very essence of courtesy. It was next to impossible to get the better of him in a bout of compliments. When all other resources failed he would come out victorious with the remark "Ganz auf meiner Seite." In spite of the great respect that was paid to him wherever he went he was always modest and unassuming and even tried to place the credit for any work which he himself had done on some one else who had merely taken a collaborator's part. It may be said without any reserve that personally he was a perfect gentleman.

D. KENNEDY FRASER.

Cornell University.

A TACHISTOSCOPE FOR CLASS EXPERIMENT AND DEMONSTRATION PURPOSES.

The need for and value of class experiments in the teaching of educational psychology have frequently been expressed in the pages of this JOURNAL and indications have from time to time been given as to how they may be employed in various spheres. If, however, the range of applicability of class experiments is to be extended, the instruments generally employed in experimental psychology will have to be modified, or new instruments devised.

The value of the tachistoscope in experimental psychology is known to all teachers and students of the subject; but, as the ordinary type can be used only for individual work and the cost of the instrument prevents it from being reduplicated for large classes, the writer has been led to consider whether a new and cheap form, suitable for class purposes, could not be devised.

The contrivance in general use which naturally occurs to one seeking a means of obtaining momentary exposures is the ordinary photographic shutter. The writer conceived that this might be modified to serve the purpose of a tachistoscope. The difficulty which then confronted him was how to obtain a suitable light. In a discussion of this problem with his colleague, Mr. A. H. Jenkins, instructor in Manual Work to the St. Andrews Provincial Committee for the Training of Teachers, the latter suggested the employment of the ordinary magic lantern. It was then evident that all that was required to obtain a tachistoscope for class experiment and demonstration purposes was to affix a photographic shutter, timed for momentary exposures, to the ordinary lantern in use in the college. This was done and the trial experiments made with it were from the very outset quite successful. Slides prepared after the fashion of the ordinary lantern slides served as exposure cards.

The arrangement is now here reported in the hope that others may avail themselves of this means of popularizing the teaching of educational psychology, for although the results obtained by class experiments may not have the scientific exactness attaching to results got by individual investigation they nevertheless carry greater conviction to the student of the subject. The objections that hold against certain forms of class experiment do not obtain in the case of the tachistoscope here suggested; for the time of exposure is determined and there is nothing to prevent the introspections being secured, as the subjects engaged can be allowed time after each exposure to report their introspections in writing. The new arrangement has the advantage over the usual type of tachistoscope employed, in that fifty or a hundred subjects can take part at the same time in the investigation, and reliable averages can be secured; whereas with the ordinary tachistoscope the time taken to do the tests individually usually prevents a sufficient number of subjects being investigated, and, as a consequence, the conclusions drawn from the results may not be reliable.

The new tachistoscope may profitably be utilized for the following purposes, which, while illustrative of psychological problems having pedagogical bearings, are also worthy of investigation on their own account, as there is a reluctance on the part of some writers to accept the present results:—the development with age of the range of attention; the proportion between the types of readers—fixating and fluctuating; the determination of the question whether this classifica-

tion into types holds in the case of school pupils. These problems may suggest others for which the tachistoscope recommended may prove suitable.

No application, it may be added, has or will be made for patent rights in this new form of tachistoscope, so that it is open to teachers of psychology or to makers of psychological instruments to improve and perfect the suggested arrangement. If it is to be characterized by any title, the writer desires Mr. Jenkins's name to be associated with his own and suggests "the Rusk-Jenkins tachistoscope."

ROBERT R. RUSK.

St. Andrews, Scotland.

THE DALLAS INVESTIGATION OF THE TEACHING OF ENGLISH AND MATHEMATICS.

Early in April of this year the Board of Education of Dallas, Texas, decided upon an investigation of the teaching of English and mathematics in the elementary schools of that city. Mr. E. D. Jennings, of the University of Texas, was selected to conduct the investigation, and was requested to make as detailed and accurate a report as possible on the instruction in these subjects in each of the elementary school rooms of the city. Over three hundred teachers were visited personally and their instruction was rated on the basis of a score card previously devised by Mr. Jennings in a survey of the Austin schools. This rating was then checked by the data available in the superintendent's office, and by the results of five tests given to all the pupils (about 8000) at the beginning of the investigation. The tests were as follows: (1) A test of the speed and accuracy of pupils in the four fundamentals of arithmetic (after Courtis); (2) a test in problems involving reasoning (after Courtis); (3) the Buckingham spelling test; (4) the Starch silent reading test; and (5) a composition test, scored with the use of the Hillegas scale. The results of these tests were computed under the supervision of members of the education faculty of the University of Texas. It is to be hoped that the report, or at least those portions of it that are of interest to scientific students of education, will be published.

ABSTRACTS AND REVIEWS

CHARLES HUGHES JOHNSTON, Editor. *High School Education.* New York: Charles Scribner's Sons, 1912. Pp. xxii, 555.

That Professor Johnston has performed a service to education in assembling and editing this book from which teachers may gain a fresh outlook on their own subjects, and at the same time obtain a perspective of the whole high school curriculum and the possible correlations of various subjects, has been demonstrated by its wide use as a text and reference book.

The strong feature of the book is that it is the first comprehensive treatment of the methods of teaching all the various high school subjects in the curriculum, by a group of men and women who for the most part are particularly well qualified to treat their respective subjects from an empirical point of view. It is most valuable as a reference book on high school subjects for principals and teachers. Of the twenty-six chapters, the first two were written by the editor, who attempted, with considerable success, in addition to giving a general discussion of the current demands upon the program of studies and the disciplinary basis of courses of study, to bring under control the general treatment of each chapter, after the sixth, by means of a common scheme of suggestive questions. In addition to the regular high school subjects are treated the *History of Secondary Curriculums Since the Renaissance, Principles and Plans for Reorganizing Secondary Education, Instruction: Its Organization and Control, and The High School Library.* The appended selected references to each chapter are well chosen and extensive in their range, including author, full title, publishers, volumes, and prices, but not including the dates of publication or, in the case of books, the number of pages.

The marked inadequacies and limitations of the book lie in the multiplicity of writers with their respective methods of expression and points of view, and the consequent lack of continuity from chapter to chapter. Education has suffered materially from the fact that authors or editors are satisfied to throw together a number of essays or papers with different points of view and little or no continuity, and call it a text-book. In medicine some valuable books

have been compiled by a group of specialists, but the number seldom exceeds eight or ten, and the fields of inquiry have been more definite, more limited, with a better organized historical setting, and the discussions have been based on experimental, empirical evidence within the particular field of inquiry.

Distinctive value would have been added to Professor Johnston's book had the contributors been selected and advised to approach their subjects from the standpoints of the *psychology of high school subjects*, and the *genetic phases of adolescent development*, which are entirely overlooked except by Professor Davis on "Principles and Plans for Reorganizing Secondary Education," Professor Elliott on "Instruction; Its Organization and Control," Professor Denney on "English," Professor Sargent on "Drawing," Professor Warthin on "Sex Pedagogy in the High School," and by the editor in Chapter I.

BIRD T. BALDWIN.

Swarthmore College.

CHARLES HUGHES JOHNSTON, Editor. *The Modern High School, Its Administration and Extension.* New York: Charles Scribner's Sons, 1914. Pp. xviii, 847. $1.75.

This is the second of a projected series of three volumes dealing with various phases of high school activities. The first volume, *High School Education*, "was concerned primarily with the problems of classroom instruction in the different high school subjects and with certain technical matters of administration closely related to these problems." The third is to deal with the problems of high school supervision. The present volume treats the high school as a social phenomenon, as a growth in response to developing social needs, and inquires to what extent the present high school organization meets those needs, and in what way the organization may be modified to meet them in a more satisfactory manner. In the words of the editor, the aim of the book is to present "a survey of policies, examples, and suggestions of ways and means of making *the strictly socializing work of our actual high schools* more definite, more effective, and more nearly universal." The volume represents the combined efforts of twenty-seven authors, and while this involves a certain amount of repetition and some lack of unity in the development of the discussion, the various chapters are well tied together by the central theme, the social function of the high school.

The first of the four parts into which the book is divided deals with the high school as a component part of a complex social organization, and considers it as a social enterprise, as a legal institution, as a business undertaking, as a continuation of the elementary school, as a preparation for higher education, and as an agency for the improvement of the industrial life of the community. In discussing high school education as a social enterprise Dr. Snedden comments upon the evidences of increasing faith in the high school on the part of the public, yet points out that courses of study are still largely traditional or are acknowledged to be makeshifts, and pleads for a reorganization of curricula on the basis of social needs and of extended scientific tests.

Part II treats of such specialized relations of high school work as class management in its relation to the family, the community, and the school subject, the direction of study, school versus home study, the home and school association, and other co-operative agencies of the high school. Of especial interest are the accounts of classes in history and in hygiene in which the pupils were encouraged to assume more and more of the responsibility for the conduct of the recitations and the teacher retired to the background. This is the ideal toward which all teachers should strive, but of which few seem to have any conception, and it will be of great value in the training of teachers to have these concrete cases made accessible. One of the most important duties of the high school is to teach pupils how to study, yet few teachers take the trouble to develop this ability in any systematic fashion. In the two chapters on study the authors summarize the recent extensive discussions of this topic and present new material on the efforts which are now being made to incorporate training in habits of study as an essential part of the school work.

In Part III the internal organization of the high school receives attention, and such topics as the improvement of teachers in service, the social activities of students, athletics, debating, journalism, and fraternity life are discussed. The lack of professional spirit in high school teachers is deplored and suggestions are made for securing broader professional reading, more helpful faculty meetings, constructive class room supervision, the broadening of departmental lines, the introduction of standard scales for rating and promoting teachers, and the arousal of interest in scientific investigations by the teachers themselves. In view of the large number of young and inexperienced teachers that enter our high schools each year it

is necessary that principals, heads of departments, and older members of the faculty assume the responsibility of training the neophytes and setting a high standard for the activities of the teachers. This is the more important because the teachers' previous training has been limited to subject matter, and there has been no contact with boys and girls.

Part IV includes such further problems as the use of the high school as a social center, continuation work, the library, vocational and avocational guidance, co-operation in English, the high school as a community art center, high school hygiene, and the moral and religious life of high school pupils. In these chapters much valuable data has been collected portraying the activities and experiments of the more advanced high schools in the country.

The book as a whole should prove stimulating and suggestive to both principals and teachers and might be used to great advantage by a corps of high school teachers as a handbook for a series of intensive studies of the problems raised.

J. C. B.

PAUL MONROE, Editor. *Principles of Secondary Education.* New York: The Macmillan Company, 1914. Pp. xxviii, 790. $1.90.

The title of this book arouses expectations which further examination leaves unrealized. One anticipates a systematic and fundamental analysis of the activities involved in secondary education, and the reduction and coördination of its manifold details into a coherent organization according to certain basic ideas. But if, after perusing the volume, one inquires what *are* the principles of secondary education, one is obliged to admit that the whole situation is as confused and chaotic as before. Indeed, from the method of construction of the book it is difficult to see how any fundamental and consistent principles could be developed. Thirty-two different authors contributed to its contents, and many of the chapters represent the combined work of two or three different writers. While each one of these authors has won distinction in his special field, the variety of views presented certainly does not make for unity of treatment, or for the development of principles. The book is rather a brief encyclopedia of secondary education, and it is stated by the editor that the material for some of the chapters was drawn from his large *Cyclopedia of Education.* Perhaps a more descriptive title

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Let it not be thought that this criticism of the book's title is any reflection upon its value. On the contrary the student of high school education will find information and stimulation in every chapter, and the book will undoubtedly be widely used as a reference work in the training of high school teachers. In the introductory chapter the editor maps out the field of secondary education and presents reasons for the great diversity of aim and procedure found there. The physical and mental changes that take place at adolescence are assigned as important factors in differentiating secondary education from that of other periods, but it is an open question whether these changes have not been greatly exaggerated in recent educational discussions, and whether the transition from childhood to maturity is not much more gradual than we have been taught to believe. Chapters II to IV outline the history and present status of secondary education in Europe and America, and Chapters V and VI discuss the organization and administration of public and private high schools.

It is Chapter VII that the educational psychologist finds of especial interest. In it Professor Whipple gives an excellent brief discussion of the psychology and hygiene of adolescence, taking up the topics of physical growth at adolescence, physiological age, the problems of sex, adolescent organizations and secret societies, pupil self-government, religious and moral development, and the complicated tangle of formal discipline as it applies to high school situations. In treating of physiological age the work of both Crampton and Foster is reported in sufficient detail to show the sharp contradiction in the conclusions of the two investigators, and further study is called for. The student will find in this chapter the best available discussion of the problems of sex hygiene and the teaching of sex in the high school. The Freudian view of the significance of sex is developed, the facts of sex impulses are faced, and the effects of sex enlightenment are ably set forth. The psychology of high school government is neatly sketched, and the value of pupil participation well stated.

In Chapter VIII, on moral and religious education, Commissioner Sisson emphasizes the importance of the development of ideals, and advocates a positive training in the biological significance of sex. He believes that the high school should provide a definite training in the functions and duties of parenthood for both boys and girls.

Chapters IX to XVI are devoted to specific high school subjects as English, Latin, and Greek, modern languages, natural sciences,

mathematics, social sciences, fine arts, and household arts. In his discussion of the aims and methods of natural sciences in the high school Professor Twiss keeps to the psychological point of view throughout, and defends a moderate and sane theory of transfer of training in the development of scientific concepts of method. He also urges a careful study of the factors of appeal, and frankly bases his selection of subject matter to a large extent upon the appeal which it makes to the pupils.

The remaining chapters deal with vocational education, hygiene, and physical education, athletics, social aspects of education, and the reorganization of secondary education. In discussing reorganization Commissioner Snedden urges that for the selection of subject matter we should study the needs of contemporary society and analyze these to determine in what way the high school can contribute to their fulfillment; and for methods of teaching we should have much more extensive experimental studies of the means by which responses may be evoked from high school pupils.

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Edited by

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EDITORIAL

FUNDAMENTALS IN EDUCATION

It is a noteworthy fact that the present is a time of unrest in education. There is not a phase of our whole educational scheme from the kindergarten to the university that is not under the fire of criticism. To some timid and conservative souls this is very disquieting, but for the optimistic and progressive it is a most hopeful sign—an indication that people are becoming dissatisfied with the passive acceptance of tradition, and are disposed to demand a type of education that is in accord with contemporary thinking. At no time in history has the public shown a greater willingness to spend money for education, but it wants to know that it is getting its money's worth. There are charges of waste in college, waste in the high school, and the greatest waste of all in the elementary school. No one feels more keenly than the educators themselves that in some way our present educational procedures are wrong. The recent report of the National Education Association committee on economy of time shows a clear realization of this waste. In many quarters complaint is made that school curricula are overcrowded, that teachers are obliged to attempt too many things, that there is a wild scramble to "cover the ground" and no intensive mastery of anything. A certain vociferous, non-reflecting element raises a great outcry against the "new subjects"

that have been introduced into the schools, holding them up to ridicule as "fads and frills." Their slogan is, "Back to the fundamentals!"

But what are fundamentals in education? An answer to this question can be found, as Commissioner Snedden has pointed out, only in a study of the social needs of our time. Is arithmetic a fundamental? Assuredly not! Even a casual inquiry will show that in all lines of social activity—in the professions, in business, in manufacturing, in banking, in social work, in the drawing room, in the kitchen—the need for arithmetic is vanishingly small. The engineers, the bankers, the insurance men, the bookkeepers resort to tables and machines for even their simplest computations. Is handwriting fundamental? The business man or the business woman scarcely uses the pen for anything more extensive than a signature, almost all literary work is produced on the typewriter, and even in social correspondence it is felt to be something of an infliction to have to decipher script when the mechanical writing is so much clearer, neater, and more legible. Is spelling fundamental? Recent studies have shown that ninety per cent. of all the words that are ordinarily used in writing are found in a list of 1000 words. Of these not over 200 words would give trouble to any one individual, and these could be learned with ease in twenty hours of properly distributed practice. Is grammar fundamental? All experimental studies agree that its contribution to efficiency in the use of language is negligible, and that it might well be relegated to the college or the graduate school. Of all the traditional elementary subjects reading alone retains its place of primary importance, and even it is undergoing striking modifications in method of treatment.

A broader conception is needed of fundamentals in education, and a consideration of the demands made by modern life upon the individual who is to pass as educated leads to the recognition of four lines of study which are basic for all education, and which should be kept in view in making curricula from the elementary school to the college. They are: (1) A study of the vernacular, including the technique of silent reading, a broad knowledge and appreciation of the best in modern literature, and fluency in both oral and written expression. (2) An understanding of and respect for the natural sciences and their significance for the conduct of practical affairs. (3). The social sciences, including history, economics, government, sociology, and individual and social psychology. (4) A comprehension of

art as the loftiest product of human intelligence, a familiarity with representative masterpieces of painting, sculpture, architecture, and music, and the development of a certain degree of skill in one or more of these lines. These are the four cardinal points of a liberal education, and should determine the direction of the teaching process in the elementary school, in the high school, and in the college. A detailed consideration of the changes in courses of study which acceptance of these four fundamentals would involve must be postponed to a subsequent occasion. It remains merely to emphasize the omission of mathematics and languages from the list of fundamentals. Far be it from the writer to underestimate the interest and value of these venerable objects of mental activity. No scheme of secondary or higher education should be devoid of opportunity for those students who wish to perfect themselves in these lines. But from the point of view of general social needs their significance is ancillary rather than fundamental.

J. C. B.

NOTES AND NEWS

Mr. W. F. Doughty, Texas State Superintendent of Schools, plans to establish a bureau of educational research and school surveys in connection with the state department of education. The director of the bureau is to be a specialist in the experimental study of school problems, and the staff is to be at the service of city and county school systems for the study of any question on which accurate information is desired. The bureau will serve as a clearing house for scientific information on educational questions and will strive to unify and direct the efforts for the improvement of educational conditions in Texas. The recent studies of certain phases of the school systems of San Antonio and Dallas have aroused much interest throughout the state in the possibilities of increasing educational efficiency, and there are many calls for unbiased reports on local conditions. If the plans of Superintendent Doughty are carried out, Texas will be one of the first states to formally recognize educational research as a function of the state department of education.

The graduate subject of Education at The Johns Hopkins University, which was formerly associated with Philosophy and Psychology, and more recently with Philosophy, has been made a separate department. The title of the chair occupied by Professor Edward F. Buchner will be changed to that of Education from the former title of Education and Philosophy. The conditions of admission to candidacy with Education as the principal subject for the degree of Master of Arts and Doctor of Philosophy will continue to be the same as in the other departments.

Dr. Jean Weidensall, whose study of the Mentality of criminal women at the Bedford Hills Reformatory will appear soon in the *Educational Psychology Monographs*, plans to work in New York City, after the first of August, establishing norms for some of the more important mental tests as applied to law-abiding women. The groups to be investigated include house maids, clerks, waitresses, laundresses, and chorus girls.

W. V. Bingham, who goes in September to take charge of the Department of Psychology and Teacher Training at the Carnegie Institute of Technology, Pittsburgh, reports that the staff for the coming year is now complete. The position of assistant professor

of psychology has been filled by the appointment of James Burt Miner of the University of Minnesota, who will specialize in statistical studies. Jonathan L. Zerbe and Katharine Murdoch remain as instructors in educational psychology, and will devote attention to the psychology of industrial processes and of the teaching of these processes. Louis L. Thurstone of the University of Chicago and Margaret L. Free of Bryn Mawr College have been appointed assistants in the bureau of mental tests, and will attempt some measurements of vocational aptitude.

Dr. Ellsworth E. Faris has been appointed associate professor of psychology, with special reference to social psychology, in the University of Iowa.—*School and Society.*

Mr. J. C. Brown, head of the department of mathematics in the Horace Mann School, Teachers College, Columbia University, and known to the readers of this JOURNAL for his contributions to the subject of drill in arithmetic, has been appointed principal of the University High School at the University of Illinois.

Professor Charles L. Simmers, assistant professor of education in the State College of Washington, has been made head of the new department of education at the New Hampshire College.

At the University of Texas Dr. L. W. Sackett and Dr. Truman L. Kelly have been promoted to the rank of adjunct professor of the philosophy of education, with which subject the work of educational psychology is incorporated in that institution.

Dr. Karl M. Dallenbach of the University of Oregon has accepted a position in the department of psychology of the Ohio State University.

Dr. E. L. Talbert has been appointed secretary of admission in the University of Cincinnati, also giving courses in social psychology. —*Science.*

Dr. Colin A. Scott of the Boston Normal School has been appointed professor of education at Mount Holyoke College to fill the vacancy caused by the resignation of Professor Kohl.—*School and Society.*

Dr. Paul R. Radosavljevich, assistant professor of experimental pedagogy in the School of Pedagogy of New York University, has been promoted to a full professorship. Dean Thomas M. Balliet will take his sabbatical year next year, and Professor James E. Lough has been appointed lecturing dean during his absence.—*School and Society.*

At Dartmouth College the courses in psychology and education, which have been taught by Professor Bingham, will next year be divided. Dr. H. C. Moore, Ph.D., Harvard, who has been teaching at Simmons College, has been appointed assistant professor of psychology. Professor J. C. McConaughy, Ph.D., Columbia, of Bowdoin College, has been appointed professor of education and executive secretary of the Committee on Admissions. Dr. McConaughy will also assume the directorship of the Summer Session. The departments of Psychology and Education will have ample room in Bartlett Hall, a building which has heretofore been occupied by the Christian Association, and which will provide two large lecture halls, general laboratory, apparatus room, shop, offices, and six small rooms well equipped for the teaching of experimental and applied psychology. Among the new pieces of apparatus being installed is a Seashore tonoscope, made by Charles F. Lorenz of Cleveland, Ohio.

Mr. E. D. Jennings, M.A., Texas, has been appointed professor of education and dean of the college at the Texas Woman's College, Fort Worth.

Mr. Thomas Alexander, Ph.D., Columbia, instructor in elementary education at the George Peabody College for Teachers, has been made assistant professor in that institution.

Dr. Guy Montrose Whipple, associate professor of education at the University of Illinois, has been advanced to the rank of full professor.

Mr. C. Truman Gray, instructor in the art of teaching at the University of Texas, has secured a leave of absence for the current year to engage in research work at the University of Chicago. He will investigate problems of reading under a special grant from the Carnegie Foundation for the Advancement of Teaching. His place at the University of Texas will be taken by Mr. James M. O'Gorman, M.A., Columbia, formerly associate professor of education at Miami University.

Dr. William F. Russell, associate professor of secondary education at the George Peabody College for Teachers, has been promoted to a full professorship.

CURRENT PERIODICALS

PEDAGOGICAL SEMINARY. Vol. XX, No. 3, September, 1913. ARTHUR K. BEIK. *Physiological Age and School Entrance.* 277–321. A review of one hundred and six books and articles on physiological and anatomical age, including a discussion of height and weight, dentition, growth of skull and brain, development of the eye, and mental development. The account of the development of the teeth is particularly detailed and helpful. The author argues that the period at which children usually enter school is one of marked transition in physical development, and that this is of far greater importance than chronological age in determining the qualifications for entrance to school.

ANNA GILLINGHAM. *One Child's Struggle in the Preparation for Life.* 343–359. An intensive study of an eight year old girl, who was slightly in advance of her age by the Binet tests, but who was a failure in school. The chief reason for the failure seemed to be a peculiar confusion of space relations for words and parts of words in reading and writing, and for the order of processes in arithmetic. The cure consisted in the gradual upbuilding of habits of procedure in attacking specific tasks. Self-confidence and eagerness to learn were encouraged by warmly praising every successful attempt and ignoring the unsuccessful ones. The training resulted in marked improvement, although the child is still somewhat defective in school attainments.

WILLIAM H. BURNHAM. *Orderly Association as a Condition of Mental Health.* 360–390. A critical study of recent experimental literature on association, showing the importance of building up definite and well-organized systems of thought connections in the process of education. Particular attention is paid to the phenomena of interference in associations, and to the necessity of reducing this interference to a minimum if good results are to be obtained in the educative process.

No. 4, December, 1913. FRANK K. SECHRIST. *The Psychology of Unconventional Language.* 413–459. The author briefly surveys the chief scientific studies of slang, makes an extended examination of the sources from which it arises, and gives a psychological analysis of the effects of its use on the basis of an experimental study with a group of university students.

CYRUS D. MEAD. *The Age of Walking and Talking in Relation to General Intelligence.* 460–484. A study of the histories of fifty normal and one hundred and forty-four feeble-minded children with reference to the age at which they began to walk and talk. Normal children begin to walk between the ages of 12 and 15 months (median, 13.54 months) and to talk between 14 and 18 months (median, 15.8 months). In feeble-minded children the median age for walking is 21.6 months and for talking 34.44 months.

ALICE C. STRONG. *Three Hundred and Fifty White and Colored Children Measured by the Binet-Simon Measuring Scale of Intelligence: A Comparative Study.* 485–515. The author followed Goddard's method of applying the Binet tests, and examined 225 white children between the ages of 6 and 12 years taken from grades I to VII in the elementary schools. The mental age distribution closely parallels that obtained by Goddard. Examination of 125 colored children showed that they were not so far advanced mentally as the whites. The "at age" group was 15 per cent. smaller, while the backward group was almost three times as large. Whether this disparity is due to racial inferiority or to difference in home environment the author is unable to say.

L. B. HILL, A. E. REJALL, AND E. L. THORNDIKE. *Practice in the Case of Typewriting.* 516–529. Two observers, Hill and Rejall, practiced copying (1) the same word passage, reducing the time and the errors as rapidly as possible, and (2) a page of approximately 300 words of changing material. The following table indicates the amount of improvement resulting from five months of daily practice. Rate is expressed in words per minute, errors in words per hundred, and the total amount of practice in hours.

	Initial				Final					
	100 Words		300 Words		100 Words			300 Words		
	Rate	Errors	Rate	Errors	Practice	Rate	Errors	Practice	Rate	Errors
Hill.....	10	13	7.1	19	8.6	35.2	6	36	23.4	3.2
Rejall.....	6.3	8	6.8	11.3	7.2	42.9	8	30.5	25.2	3.6

The rate of improvement was fairly uniform, with a slight convexity of the curve at its beginning, and little evidence of "plateaus." The authors conclude that "forty hours of well-distributed practice will enable an intelligent student to copy on the machine approximately as fast as he can by hand."

Vol. XXI, No. 1, March, 1914. E. A. HAMILTON. *Eugenics.* 28–61. A review of one hundred books and articles grouped under the headings: historical, analogical studies, pathological studies, sociological studies, and positive studies. An interesting and valuable summary.

GEORGE E. JONES. *Tuberculosis among School Children.* 62–94. An abstract of recent literature on the subject, embracing 106 numbers. The author concludes that tuberculosis is preëminently a disease of childhood, that much more extensive data should be gathered on the subject and much greater publicity given to it, that greater care should be exercised in the construction of school buildings, in school medical inspection, and in securing recreation for teachers and pupils, and that open-air schools should be more generally introduced.

WILLIAM BOYD. *The Development of a Child's Vocabulary.* 95–124. Records were made at 17 months, and at the end of the second, third, and fourth years. The method consisted in writing down all the sentences that could be noted during the last fortnight of each

year. The words are then tabulated according to parts of speech and subdivisions. A complete vocabulary computed from these sentences and from other sources showed 1657 words at the end of the third year, and 2598 words at the end of the fourth year.

ARTHUR DERMONT BUSH. *The Vocabulary of a Three-Year-Old Girl.* 125–142. A record was kept by the child's mother and father for six months before the child's third birthday, and this list was amplified by tests made with the help of a small dictionary and by comparison with Whipple's list. The total number of words noted was 1944, as compared with Whipple's 1771. There is a brief reference to the agreements and differences noted in the two lists.

THEODATE L. SMITH. *The Development of Psychological Clinics in the United States.* 143–153. Among the clinics mentioned are those of Witmer, at the University of Pennsylvania; Wylie, at Faribault, Minn.; Goddard, at Vineland, N. J.; Healy, at Chicago; Stevenson Smith, at the University of Washington; Miner and Woodrow, at the University of Minnesota; and Wallin, at the University of Pittsburgh. The author believes that this work is still in its infancy, and advocates the establishment of pedagogical clinics in connection with school systems.

No. 2, June, 1914. ERNEST C. MCDOUGLE. *A Contribution to the Pedagogy of Arithmetic.* 161–218. There is a brief historical sketch of arithmetic, a consideration of the psychology of arithmetic, a fairly detailed account of recent experimental studies, with especial attention to those of Rice, Stone, and Courtis, and suggested norms for text-books and teaching. The bibliography contains 141 numbers.

WILLIAM H. BURNHAM. *A Health Examination at School Entrance.* 219–241. A summary of Thiele's study of the biology of school beginners, a discussion of the conditions which determine when a child should enter school, and a detailed consideration of the scope and significance of the examination. Among the reasons given in favor of such an examination are to exclude from the school those children who are physically unable to profit from it; to educate teachers and parents in matters of health; and to facilitate proper grading and adaptation of the work of the school to the capacities of individual pupils.

G. STANLEY HALL. *Some Psychological Aspects of Teaching Modern Languages.* 256–263. Foreign language instruction should begin at about the age of ten. The study of a living should precede that of a dead language. Only one foreign language should be taught at a time. Language lives in the mouth and the best results can be obtained only by developing a certain mouth and ear consciousness. Reinforcement by pictures, objects, and acts is of the greatest value. It is of doubtful psychological value to try to exclude aids from other languages. The "natural method" is unnatural in that it ignores a most elaborate set of linguistic associations already established. All hyper-methodic ways of learning a new language are to be regarded with suspicion.

MARTHA J. FULTON. *An Experiment in Teaching Spelling.* 287–289. One hundred words were taught in ten days, ten each day, to a group of 4B pupils, using the following procedure: Each word was written on the board, its meaning explained, it was used in a sentence by the children, it was written ten times by the children and each letter pronounced aloud, and difficult parts of each word were emphasized by intonation of the voice or by colored chalk. Following this one hundred words of similar difficulty were assigned ten words each day with no further directions than to "study the lesson." The results were strikingly in favor of the systematic drill.

No. 3, September, 1914. GUSTAVE A. FEINGOLD. *Suggestions Toward a Study of Mediocrity.* 336–342. A statistical study of the results of ten tests given to a class of 49 college students in Greek philosophy. The author concludes that the so-called mediocre students are not really mediocre in their mental grasp, but more erratic in their methods of study, and that these students need attention perhaps even more than those at the top or the bottom of the class, since for them everything depends upon the proper stimulus.

C. K. LYONS. *The Doctrine of Formal Discipline.* 343–393. The author sets up Locke as the classical protagonist of formal discipline —a procedure that would not pass without protest from many students of education. There follow a detailed analysis of recent experimental studies on transfer of training, an exposition of Thorndike's principles of learning, an enumeration of the things that transfer, and a discussion of the mechanism of transfer. The author reaches the rather startling conclusion that "all learning from experience, all thinking, all inference is transfer." From this point of view it would seem that those subjects which have the highest thought values also have the highest disciplinary values—a view which is almost diametrically opposed to that held by the defenders of "formal" subjects.

CYRUS D. MEAD. *Height and Weight of Children in Relation to General Intelligence.* 394–406. A comparison of 481 normal school boys and girls with 429 feeble-minded boys and girls shows that the feeble-minded are generally deficient in physical development and the greater the mental defect the greater the physical retardation.

E. C. ROWE. *Five Hundred Forty-Seven White and Two Hundred Sixty-Eight Indian Children Tested by the Binet-Simon Tests.* 454–468. The author presents detailed tables of distribution by ages and grades for the white children, who were tested with both the 1908 and the 1911 forms of the scale, and for the Indian children, who were tested by the 1911 scale alone. There are also tables showing the percentage of correct answers for any particular age, and a table showing the mental distribution and the percentage testing at and above age for each chronological age. The Indians are everywhere inferior to the whites, and the difference between them is much greater than the difference between white and colored children discovered by Strong.

PUBLICATIONS RECEIVED

(Notice in this section does not preclude a more extended review.)

L. R. ALDERMAN. *School Credit for Home Work.* Boston: Houghton Mifflin Company, 1915. Pp. viii, 181. $1.00.

If motivated study is the only study of real value the closer the union between school and life work the better will both sets of tasks be performed. In many ways the school is reaching out into the home, and now it is proposed to take the home into the school. The little book under discussion shows how this is being done. Part one is composed of a series of chapters to show the value of such an arrangement, while in part two the author presents representative plans for crediting home work. The author has performed a service in assembling this material in a single volume.

LEONARD P. AYRES. *A Measuring Scale for Ability in Spelling.* New York: Russell Sage Foundation, 1915. Pp. 58. Scale 5c, Monograph 30c.

The two striking features of this scale are: first, the selection of the thousand commonest words in the English language, and second, the determination of the difficulty of these words as spelled by children of different grades. From four different sources the author determined the frequency of the commonest words in each 100,000 running words. The thousand commonest words were then arranged in fifty lists of twenty words each and sent to the superintendents of 84 cities. The results present an aggregate of 1,400,000 spellings secured from 70,000 children. On the basis of these data the words were so arranged in 26 columns that all of the words in each column are of approximately equal spelling difficulty, and that the steps in spelling difficulty from each column to the next are approximately equal steps. At the top of the scale there are numbers which indicate what percentage of the words in each column is spelled correctly by the children of each grade from the second to the eighth. It is an extremely interesting effort at scale construction and will undoubtedly have a decided use in testing the results of school work.

GEORGE HERBERT BETTS. *My Chance to Achieve.* Indianapolis: The Bobbs-Merrill Company, 1915. Pp. 78.

A series of interesting talks on some of the fundamental questions that we want our boys and girls to think about. The topics are: the significance of great discoveries; the teachings of experience; the call

of opportunity; the challenge of the present; and the meaning of the self. The book constitutes a challenge to enterprising and ambitious youth to make the most of themselves.

L. R. Blaich. *Three Industrial Nations.* Cincinnati: American Book Company, 1915. Pp. 366.

The three nations whose industries are described are Germany, England, and the United States. While the present book was planned and constructed before the outbreak of the war, the topics treated make it a most fascinating work for the understanding of the resources of the belligerents and for the opportunities of America in her relations to the other countries of the world. The book is profusely illustrated, contains many splendid maps, and it will be found interesting to both young and old.

Walter B. Cannon. *Bodily Changes in Pain, Hunger, Fear, and Rage.* New York: D. Appleton and Company, 1915. Pp. xiii, 311. $2.00.

The author's investigations on the physiology of digestion have secured him an enviable position in the world of science. In this book he has set forth the results of these investigations in consecutive form and in such simple language that the account may be understood by the intelligent layman as well as by the physiological specialist. Such a simple and popular, but accurate and scientific, account of researches into the functions of emotional excitement will be of decided practical value as well as of theoretical interest. The psychology of the emotions has not as yet attained to great heights of development, and this contribution to the subject from the physiological side furnishes data which are basic for the psychologist, the educationist, and the man of practical affairs.

George W. Crile. *The Origin and Nature of the Emotions. Miscellaneous Papers.* Philadelphia: W. B. Saunders Company, 1915. Pp. vii, 240. $3.00.

The author brings together in this volume a number of papers and addresses in which he expounds and advocates his kinetic theory of shock as the phylogenetic origin of the emotions. From extended researches the author is convinced that he has established the pathological identity of surgical and emotional shock. The argument starts with Darwin's pioneer work on the expression of the emotions in man and animals, and is based largely on Sherrington's "The Integrative Action of the Nervous System," and on Cannon's "Studies on the Physiological Effects of the Emotions." The book is intended more for the specialist in psychology, physiology, or medicine than for the general reader.

BENJAMIN DUMVILLE. *The Fundamentals of Psychology.* Baltimore: Warwick & York, Inc., 1915. Pp. lx, 382. $1.40.

The subtitle of this book is "A Brief Account of the Nature and Development of Mental Processes for the Use of Teachers." The book is intended as a text for use in training schools for teachers. The author believes that there is a distinct value in the study of pure psychology for those who are intending to undertake the work of teaching. The introductory chapter presents a defense of this position and the subsequent chapters deal with the relation between body and mind, the analysis of mental phenomena, sensation, perception, imagination, ideation, memory, conation and feeling, instincts, the sentiments, the will, and attention. Whether the author may be indulged in the desire to call his treatment of the subject "pure psychology" is open to question. The emphasis seems to be laid upon the application of certain psychological principles to educational procedure rather than upon the strict analysis of consciousness. Continental writers on psychology are pretty generally ignored, but there is liberal mention of the results of English and American investigations. The argument is scholarly and sustained, and the book is worth careful reading and study by every teacher.

LU LESTER EVERLEY, RALPH E. BLOUNT, AND CALVIN L. WALTON, *A Brief Laboratory Course in Physical Geography.* Cincinnati: The American Book Company, 1915. Pp. 98.

A laboratory outline in loose-leaf note book form, containing questions, problem exercises, and experiments that will tend to deepen and vivify the pupils' interest and proficiency in physical geography. A worthy step in the right direction in treating this subject.

M. E. HAGGERTY. *Arithmetic: A Coöperative Study in Educational Measurements.* Indiana University Studies, No. 27. March 1, 1915. Pp. 385–508. 50c.

With the assistance of twenty Indiana city superintendents the author gave the Courtis Standard Tests in Arithmetic, Series B, to 8712 school children. The monograph presents a detailed tabulation of the results and a discussion of the Courtis Tests as instruments of educational research. In spite of certain objections the author cordially endorses the use of the tests and indicates the advantages which will accrue from their use to the pupils in, and the managers of, a school system. It is the most detailed and best organized study of attainments in arithmetic that has yet been made.

REUBEN POST HALLECK AND ELIZABETH GRAEME BARBOUR. *Readings from Literature.* Cincinnati: American Book Company, 1915. Pp. 320.

Selections from English and American prose writers and poets

intended to serve as a basis for practise in oral and written English. They range from Wordsworth to Alfred Noyes, and from Jonathan Swift to O. Henry.

W. H. Heck. *The Health of School Children. Contributions from American Medical Journals, July, 1913–July, 1914.* Bulletin No. 628. Washington: Bureau of Education, 1915. Pp. 160.

The compilation includes articles on the medical inspection of schools, organic diseases of children, care of crippled children, defective eye-sight, treatment of teeth, obstructions of nose and throat, conservation of the hearing, the hygiene of nervous children, the treatment of the feeble-minded, and general school hygiene.

Lester S. Ivins and Frederick A. Merrill. *Practical Lessons in Agriculture.* Cincinnati: American Book Company, 1915. Pp. vi, 223.

The materials in these lessons are arranged by months in such a manner that the subjects studied may be as seasonable as possible. The selection from a wide range of possible topics seems to have been determined by a judicious combination of the practical and the scientific. There is a wealth of illustration and diagram.

C. G. Jung. *The Theory of Psychoanalysis.* Nervous and Mental Disease Monograph Series, Number 19. New York: Nervous and Mental Disease Publishing Company, 1915. Pp. 135. $1.50.

The lectures comprised in this volume were delivered in the extension course at Fordham University, New York City, in 1912. In them the author sets forth his views of psycho-analysis, and shows how they differ from those of his colleague and master, Sigmund Freud. Among the most interesting chapters of the book are: chapter one, A Consideration of Early Hypotheses; chapters five and seven, The Unconscious and Its Contents; and chapters nine and ten, On the Therapeutical Principles of Psychoanalysis, and General Remarks. One is impressed by the high degree of symbolism and the imagination displayed in the analysis and interpretation of dreams and of the results of psychoanalysis. This, of course, is justifiable if in terms of the pragmatists "it works." With critical scrutiny of results the bizarre and fantastical will gradually be eliminated and the kernel of truth, which is undoubtedly to be found in the theory of psychoanalysis, will be revealed and substantiated.

T. N. Kelynack. *Defective Children.* New York: William Wood and Company, 1915. Pp. xvi, 462. $3.00.

The aim of the book is to provide authoritative information regarding the chief classes of defective children that require special medical

supervision and educational care. Each chapter of the volume has been written by a recognized expert who has been allowed a free hand in the expression of his information. There is a group of chapters on types of mental defect, defects of vision and hearing, and special defects. There are chapters on spinal and nervous troubles, on disturbances of the heart, on boys and girls of defective growth in secondary schools, on school clinics and dental clinics, and on open-air schools and schools for cripples. The final group of chapters deals with the means for finding, caring for, and educating defective children in Scotland, Ireland, Canada, United States, France, Germany, and Hungary. As a reference manual on the defective child the work will undoubtedly find a permanent and abiding place.

E. A. KIRKPATRICK. *The Use of Money.* Childhood and Youth Series. Indianapolis: The Bobbs-Merrill Company, 1915. Pp. 226. $1.00.

In spite of all that may be said in criticism of the American people in their eager pursuit of the dollar, it must be admitted that money is one of the highest symbols of well-being in modern civilization. Money as money amounts to very little, but as representing the results of strenuous endeavor and the possibilities of further influence for good and bad, money is one of the most idealistic topics of modern times. Again and again one hears of young people who fail or go wrong because they have no conception of the proper use of money. Many parents fail to realize their opportunities and fail to take seriously the obligation which rests upon them of training their boys and girls to become efficient citizens. The present book will be of great assistance to parents and teachers in training children in the proper use of money. There are chapters on the natural development of ideas of money, on the training of children in how to spend money, on the subject of allowances, the purchase of their own clothes, private accounts, and the use of financial situations in school arithmetic. The book is written in the author's customary lucid style, and will be a boon to many a puzzled parent.

GEORGE TRUMBULL LADD. *What to Believe? An Inquiry into the Nature, the Grounds, and Value of the Faiths of Science, Morals, and Religion.* New York: Longmans, Green and Company, 1915. Pp. viii, 275. $1.50.

This is a continuation of Professor Ladd's practical discussions of philosophical problems. The first attempted to answer the inquiry, "What can I know?"; the second, "What ought I to do?" The present book contains the answers of the philosopher to some of the fundamental questions of belief propounded by the intelligent layman. The author clearly points out the fact that the scientist depends

upon belief no less than the follower of religion. The essential difference between them lies in the foundations of their beliefs. A chapter is devoted to a discussion of the famous phrase of James, "The Will to Believe." There is a comparison of lesser and greater beliefs, a consideration of the rights and applications of belief, a comparison of scientific and social beliefs, and an examination of the faiths of morality and religion. The author finds religious belief the highest form of human attitude.

ROBERT A. LYSTER. *School Hygiene.* Baltimore: Warwick and York, Inc., 1915. Pp. viii, 388. $1.15.

An important step in hygienic reform is the recent legislation which makes medical inspection compulsory in many school systems. The present volume is designed to enable teachers to obtain sufficient training in hygiene that they may be capable assistants to the school medical officer. The divisions of the book are the traditional ones of the school building, the scholar and his physical training, the laws of health and medical supervision, school medicine and surgery. The chapter on the hygiene of the eye gives a fairly extended account of the anatomy of that organ, methods of testing vision, and some of the results obtained from such tests. As a brief outline survey of the whole field the author's task has been performed with credit. The book will be found very useful for those who have no access to the larger and more detailed discussions.

ALBERT A. MÉRAS AND B. MÉRAS. *Le Premier Livre.* Cincinnati: The American Book Company, 1915. Pp. 200.

This is an elementary French book which is constructed on the basis of Hector Malot's "Sans Familie." The lessons include a study of words, reading, conversation, grammar, and composition. The illustrations are genuinely French, and will serve to make the work more attractive to beginning pupils.

F. W. MOTT. *Nature and Nurture in Mental Development.* New York: Paul B. Hoeber, 1915. Pp. xii, 151. $1.50.

This is a popular exposition of the principles of heredity as shown in mental activity. In the discussion of mental deficiency the author contends that 75 per cent. of mental defect is due to heredity and only 25 per cent. to pre-natal and post-natal conditions. While stressing the tremendous influence of heredity in mental development, he points out that it is not yet proven that mental characters conform to Mendel's Law, as the conditions are too complex to admit of factorial analysis. There is a brief consideration of genius in relation to heredity, the inheritance of individual characters, temperamental inheritance, the influences of nutrition and education in mental development, the function of sleep, the effect of the emotions on mental growth,

the control of the emotions, and the establishment of good habits. Interesting lessons are drawn from the education of Laura Bridgeman, Helen Keller, and others suffering from sense defects, and there is a cursory reference to the order of development of the physiological functions of the brain. The author's message contains nothing new for the specialist, but some of the fundamental facts of heredity are clearly and concisely put.

J. HERBERT PARSONS. *An Introduction to the Study of Color Vision.* New York: G. P. Putnams Sons, 1915. Pp. viii, 308. $3.75.

This book will be a boon to advanced students of psychology, for it brings together in compact form the most recent investigations upon the subject. Part one deals with the chief facts of normal color vision, outlining the physical, anatomical, and psychological basis of color, discussing the color vision of the light and the dark adapted eyes, the sensitivity of different regions of the retina to color stimuli, and the evolution of color vision. Part two presents the chief facts of color blindness, and part three outlines the most important theories of color vision. The book will be an indispensable adjunct to the psychologist's library.

JAMES JACKSON PUTNAM. *Human Motives.* Boston: Little, Brown and Company, 1915. Pp. xvii, 179. $1.00.

A study in the psychology and philosophy of human conduct based largely on the author's use of the Freudian psychoanalytic method of mental diagnosis. The author finds the two main sources of motive in the desires and instincts which have come to us from our evolutional history, and the aspirations which arise from our social relationships. The first chapter describes the sources of motives and indicates the significance of the psychoanalytic as contrasted with the philosophic method of study. Chapter two discusses the rational basis of religion, developing the relation of the individual to the creative energy which underlies the universe. Chapter three deals with the history of the psychoanalytic movement, and chapter four with its educational bearings. Chapter five discusses further the clash between instincts and ideals, and chapter six develops an attempt at synthesizing the various elements entering into conduct. The book presents the reflections of one of the most scholarly neurologists in the country upon the problems of general conduct and education. It deserves and will undoubtedly have a wide reading.

Report of a Survey of the School System of Butte, Montana. Butte: Board of School Trustees, 1914. Pp. ix, 163.

The Butte Survey Commission consisted of Prof. G. D. Strayer of Columbia; Frank P. Bachman, New York City; Ellwood P. Cubberley, Stanford University; William T. Bawden, U. S. Bureau of

Education; and F. J. Kelley, State Normal School, Emporia Kansas. The report is in two parts. Part one deals with the instructional problem, discusses the classification and progress of pupils, the equality of instruction, the courses of study, the achievements of pupils, the supervision of instruction, and the adaptation of schools to community needs. The achievements of pupils were measured by using the Ayres Spelling Test, the Hillegas Scale for English Composition, the Thorndike Scale for Hand-writing, the Courtis Standard Tests in Arithmetic, Series B, and the Stone Reasoning Problems. The results of these measurements are presented in both tabular and graphic form, and constitute a significant contribution to the literature of school measurements. Part two deals with the administrative problem, and discusses the general administration of the school room, the selection, training, and salaries of teachers, school buildings and equipment, school records and reports, and the financial conditions of the school system.

Report of Fifty-two Borderline Cases in the Rome State Custodial Asylum. Eugenics and Social Welfare Bulletin, No. 4. Albany, N. Y.: Bureau of Analysis and Investigation of the New York State Board of Charities, 1914. Pp. 99.

The investigation of these 52 children consisted of two distinct parts—the study of the family history, and the study of the individual child. The family history was secured by personal visits, if possible, by the study of the records on file, by securing information from agencies dealing with the case, and by interviews with the commitment officers. The study of the children consisted of a mental examination by means of the Binet-Simon Measuring Scale of Intelligence, and a comparison of the results with previous tests made within the last year or two years by the same scale. This procedure gave an opportunity to measure the mental changes in the interim. Such reports are valuable not only in dealing with the individuals involved, but in establishing a body of carefully gathered material which will increase our knowledge of the status of the feeble-minded and will enlighten us as to the best method of procedure in dealing with these unfortunates.

Report of the Work of the Bureau of Education for the Natives of Alaska, 1912–13. Bulletin, Number 605. Washington: Bureau of Education, 1914. Pp. 62. 25c.

This monograph contains a general report of Alaskan education, a discussion of the reindeer service, the special reports of superintendents and teachers, and reports of health conditions in Alaska. There are many illustrations of work among the Eskimos, and there is an excellent map of Alaska showing the location of the educational stations.

Roberts's Rules of Order, Revised. Chicago: Scott, Foresman and Company, 1915. Pp. 323.

A revision and enlargement of the standard manual on rules of order to meet the increasing complications of parliamentary gatherings. The new book contains nearly twice as much material as the last previous edition, and on parliamentary points is strictly up-to-date.

ISAAC SHARPLESS. *The American College.* New York: Doubleday, Page and Company, 1915 Pp. xi, 221. 60c.

The author, who was for thirty years president of Haverford College, is excellently equipped for the task which he has undertaken. He presents first a brief history of the American college, then discusses college administration, the courses of study in college, student life, and the function of the college in relation to the secondary school, the university and the public.

GUY MONTROSE WHIPPLE. *Manual of Mental and Physical Tests.* Second Edition, Revised and Enlarged. *Part II: Complex Processes.* Baltimore: Warwick & York, Inc., 1915. Pp. v, 336. $2.00.

The second volume of the *Manual*, which has been impatiently awaited by educational psychologists for a long time, gives evidence of extensive and thorough-going revision. Two new tests have been added, and the discussion of the old ones has been completely rewritten and materially expanded to take account of the progress in experimental investigations since 1910. The subject matter of the second volume is of more vital interest to the educationist than that of the first, in that the tests considered have to do with description and report, association, learning, memory, suggestibility, imagination, invention, and range of vocabulary. The two new tests introduced are the Kent-Rosanoff uncontrolled association test, and the analogies test, brought into prominence by the work of Burt and Woodworth and Wells. Of especial significance are the tests for fidelity of report, after Stern, in which reference is made to recent work by Dallenbach, Boring, Schultz, Lipmann, and Franken; the substitution test, based almost altogether upon work done since 1910; memory for ideas, involving recent investigations by Pyle, Vos, Simpson, Aall, Heymans, Michotte, and Winch; linguistic invention, with a consideration of the work of Burt, Wyatt, Meumann, Weidensall, and Woolley and Fischer; the Ebbinghaus completion test, with new results by Fraser, Heymans, Simpson, and Terman and Childs; and the interpretation of fables, based especially upon the work of Terman and Childs. It will be a matter of regret to many that, owing to the tremendous increase in critical and experimental material, the author was obliged to omit the chapter on the Binet tests. In lieu of this he promises

a supplementary volume which will deal in a comprehensive manner with the Binet and other systems of tests.

Whittier State School. Biennial Report of the Board of Trustees and Superintendent. Whittier, California; Department of Printing Instruction, 1914.

A significant feature of this report of the California state reform school is the psychological survey of the school by Mr. J. Harold Williams and Professor Lewis M. Terman of Stanford University. The examination of the boys with the Terman form of the Binet Scale showed that approximately 28 per cent. were definitely feeble-minded, 25 per cent. were border-line cases, 22 per cent. belonged to the "dull normal" group, and only 25 per cent. gave evidence of average or superior intelligence. There are numerous graphs showing the racial distribution of the pupils, and the status of each racial group by chronological and mental ages.

Richard H. Williams and Walter G. Whitman. *Laboratory Exercises in General Chemistry.* Cincinnati: The American Book Company, 1915. Pp. 161.

The plan of this laboratory manual is to combine the printed directions for the experiments and the written reports of the experiments in a single volume. The volume is constructed on the loose-leaf principle, so that leaves for further directions or discussion may be inserted at pleasure. The authors believe that their plan will make for clearness of direction, compactness of report, and ease in controlling the work of the class by the instructor.

John Dutton Wright. *What the Mother of a Deaf Child Ought to Know.* New York: Frederick A. Stokes Company, 1915. Pp. xix, 107. 75c.

The author's chief plea to the mother of the deaf child is "Do not delay his education." Since the deaf child necessarily has more difficulty in learning than the hearing child, he should begin earlier and be kept more persistently at it. The principal form of early training consists in talking to the child just as if he could hear. By securing the child's attention to the movement of the lips he can soon be taught to understand the substance of much that is said, and the foundation will be laid for the detailed study of lip-reading which will come later. On the negative side, the author begs the mother not to try to teach the child to talk. This is too difficult for any one but the trained expert and the inexpert teacher may do much damage. Furthermore, the mother is urged to send her child to a school for the deaf at the earliest possible date, secure in the consciousness that such associations will in every way be better for the child, and will prepare him the most effectively for his later work in life.

ROBERT M. YERKES, JAMES W. BRIDGES, AND ROSE S. HARDWICK. *A Point Scale for Measuring Mental Ability.* Baltimore: Warwick & York, Inc., 1915. Pp. viii, 218. $1.25.

The authors are convinced that the Binet mental age scale has served its purpose and must give way to a superior and more flexible method of mental measurement. The present volume represents an effort to develop a scale which will take account of differences in the responses to each test, and which will depend for its evaluation upon norms derived from actual measurements. Part I gives a general description of the Point Scale, the mental functions tested, and the distribution of credits among these functions. The tests are chosen chiefly from the Binet material, as this has been extensively used and each test has a large amount of critical and statistical data for comparison. Part II presents the results of the application of the scale to 850 normal individuals, chiefly elementary school pupils ranging from four to fifteen years. There are elaborate tables and graphs of the findings, norms for age, sex, linguistic, and social status, a discussion of the limits of applicability of the scale, and a study of the reliability of the results on the basis of 100 individuals measured by both the Point Scale and the Binet Scale. Part III describes the application of the Point Scale to 155 defective or deranged individuals, and Part IV makes an analysis of the results thus far obtained as a basis for a revision of the Point Scale, presents the revised scale with detailed directions for its application, and derives the principles of a universally applicable measuring scale for mental ability. The book will prove a valuable and fruitful contribution to the literature of mental testing.